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Montana Rivers Study Data Management System

User's Manual

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USER'S MANUAL

MONTANA RIVERS STUDY
DATA MANAGEMENT SYSTEM

Version 1.0
March 1987

Prepared for

Montana Natural Resource Information System
Montana State Library
1515 E. Sixth Avenue
Helena, Montana 59620

Montana Department of Fish, Wildlife and Parks
1420 E. Sixth Avenue
Helena, Montana 59620

by

MORRISON-MAIERLE, INC.
Consulting Engineers
Computer Services Division
1600 Poly Drive - Suite 305
Billings, Montana

INTRODUCTION

The Montana Rivers Study data base represents the compilation of several complex data bases from throughout the state of Montana into one large data base management system. Information pertaining to Fisheries, Wildlife, Recreation, Natural features, and Cultural features along Montana's waterways is readily available to you through this information management system.

The master data base is maintained through the Montana Natural Resource Information System in Helena, Montana. Updates to the information contained in the master data base will be periodically distributed to users on flexible disks as additional information is gathered and collated into the master data base.

This information management system is written in dBASE III Plus, a powerful data base management software system developed and marketed by Ashton-Tate. Software query, editing, listing and update programs for the NRIMS system were written by William G. Enright, P.E. of Morrison-Maierle, Inc., Billings, Montana.

Users are asked to supply written comments and suggestions on how to improve this system either to Larry Thompson, Program Director, Natural Resource Information System, Montana State Library, 1515 E 6th Avenue, Helena, MT 59620 (406) 444-3115, to Janet Decker-Hess, Montana Department of Fish, Wildlife and Parks, P.O. Box 67, Kalispell, MT 59901 (406) 752-5501, or to Bob McFarland, Montana Department of Fish, Wildlife and Parks, Wildlife Research Bureau, Montana State University, P.O. Box 5, Bozeman, MT 59717 (406) 994-3285.

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CHAPTER 1

SUMMARY AND PURPOSE

1. SUMMARY and PURPOSE

1.1. Summary:

This User's Manual is designed to help you use the Montana Rivers Study data management system. The system is written in dBASE III Plus, an efficient data base management system. You, as a user, need not be concerned about understanding the inner workings of dBASE III Plus. The information management system that you will be using is completely menu driven, allowing you total access to all of the functions and utilities available in the information management system.

The Montana Rivers Study Data Base is being managed by the Montana Natural Resource Information System, Montana State Library, 1515 East Sixth, Helena, Montana 59620, phone (406)444-3115.

Questions regarding the data base or its use should be referred to:

Programmer/Analyst
Montana Natural Resource Information System
(406)444-3115
or
Janet Decker-Hess
Montana Department of Fish, Wildlife & Parks
(406)752-5501

The Montana Rivers Study data base is a dynamic system and will be continuously updated. However, it is crucial that any updating or changes in data be centrally coordinated. You should never attempt to modify the data in your copy of this data base. Instead, list your suggested changes or mark them on a copy of the printout and send them to the responsible senior resource expert (refer to the Appendix D for names and addresses of senior resource experts). Any comments regarding the data management software itself should be addressed to NRIS. If you encounter a problem with the query programs, first turn your printer on, hit the "escape" key, then hold down the shift key and simultaneously hit the "PrtSc" key. This will produce a printout of the screen and record of the program(s) causing the problem. Next, on this printout write the choices you made from the previous menus to get to this point (for example, "Resource area detailed report; Wildlife; Geographic areas; Townships and Ranges). If this is not done, it is virtually impossible to identify and correct the problem.

Throughout this manual examples using actual data from the data base will illustrate the ease of use and the power of the system. By replicating the examples in this manual on your own system, you will learn your way around the system and will become more familiar with its operation and its limitations.

Because of the very large size of some of the data files contained in the system, the programs may seem relatively slow when first compared with other software systems that you may be using. However, don't let the apparent lack of speed fool you. The data comprising the Montana Rivers Study is contained in several very large files. Some of the routines use all of these files to gather the information that you request.

While it may appear that the computer is resting, it is actually performing many calculations, relationships and file management tasks. Be patient and you will be very pleased with the vast amount of information you can obtain from the system.

1.2. Purpose:

The purpose of this manual is to help you gain access to the composite data base generated by the Montana Rivers Study. This manual is not intended to be a short course in dBASE III Plus, but is designed to be a tool to help you use the Montana Rivers Study Data Management System.

For those users interested in dBASE III Plus, there are numerous reference books available at better bookstores that will provide you with all the information you desire on the dBASE III Plus data base management system.

CHAPTER 2

STARTING THE SYSTEM

2. STARTING THE SYSTEM

2.1. System Requirements

To operate the Montana Rivers Study data management system, you will need a microcomputer with an MS-DOS or PC-DOS operating system, at least a 10 megabyte hard disk with at least 5 megabytes of free disk space, 512 K RAM, and dBASE III plus.

2.2. Installing the Rivers Study Data Base

The Montana Rivers Study files should be copied onto your hard disk into a subdirectory called C:\DBASE\RIVERS>. If necessary, add "PROMPT PG" and "PATH C:;C:\DBASE" to your AUTOEXEC.BAT file to show the subdirectory title at the prompt and to allow dBASE III to run from the subdirectory.

2.3. Loading dBASE III Plus

If dBASE III Plus is not installed on your system, follow the instructions supplied with dBASE III Plus and install the system on your hard disk.

In order to utilize the data management system, first you must load dBASE III Plus. Type DBASE RIVERS <cr> (return). This will load both the dBASE III Plus system and the Rivers Study data management system. After a few seconds, the welcoming screen of the management system will display on the console.

2.4. Standard Key Conventions

Standard Conventions used throughout this manual are shown in the following table.

<cr>	Enter or Return Key.
Arrow Keys	Cursor control keys on the numeric keypad.
PgDn	The Page Down Key "PgDn" on the numeric keypad.
Backspace	The Backspace key usually located above the Enter or Return key.

The "key" linking all data files together is the Montana Department of Fish, Wildlife and Parks water code, a six-digit number unique to every major river or stream (see Appendix A).

2.5. The Welcome Screen:

The welcome screen displays overall operational capabilities of the NRIS system in very broad terms. The main purpose of this screen is to notify you that the data management system is active and provide general information to the new user. The screen will not appear again until the system is restarted.

```
        M O N T A N A   R I V E R S   S T U D Y   D A T A   B A S E

Welcome to the Montana Rivers Study Data Base.  This program allows you to
access data on          :Fisheries
                        :Wildlife
                        :Natural Features
                        :Recreation
                        :Cultural Features
                        :Institutional Constraints
of Montana Rivers.

You will be presented with a series of menus allowing you to select:

(1)  The Resource category you're interested in;
(2)  The specific river, drainage area, or other geographical area
     you're interested in;
(3)  The format in which you would like the data presented, and;
(4)  The level of detail you require for the data.
```

Fig. 2-1: The Welcome Screen

After reading the welcoming screen, press any key to continue. All menu selections respond as soon as you press a key corresponding to the menu selection you desire. However, there are certain submenus that do require the use of the Enter or Return key during completion of the menu. These situations will be noted in the appropriate sections of the manual.

2.6. The Master Menu:

The MASTER menu will display on the console after you press the <cr> key. This menu is the "heart" of the Rivers Study management system. All of the functions available within the system are called in part from this menu.

Note that the upper left corner of the menu tells you that you are in the MASTER menu. This display of the menu name is typical throughout the data management system. Another standard function built into the system is the "0" (zero) option. By pressing the "0" key at any menu, you will either return to the MASTER menu or the menu immediately preceding the current menu. Therefore, repeated selection of the "0" option will return you to the MASTER menu and ultimately return you to the operating system.

```
MASTER
                          MONTANA RIVERS STUDY
                               DATA BASE
                             Release  1.00

     EDIT/UPDATE                      REPORT/DISPLAY
     A. EDIT/ADD/DELETE RECORD        1. VALUE CLASS SUMMARY BY WATER CODE
     B. BATCH FILE UPDATE             2. VALUE CLASS SUMMARY BY REACH
     C. PACK FILE                     3. RESOURCE AREA DETAILED REPORT
     D. REINDEX FILE                  4. STRAIGHT FILE DUMP
                                      0. EXIT TO DOS

Select:
```

Fig. 2-2: The Master Menu

If you inadvertently return to the operating system by PRESSING "0" (zero), you must "restart" the system as described in the previous section of this chapter.

2.7. Master Menu Selections:

The MASTER menu lists the 9 choices (A,B,C,D,1,2,3,4,0) available in the data management system. Selection of some of these menu selections will present submenus. By working your way down through the menus, you will discover the flexibility built into the information management system. If you happen to "over shoot" a menu, pressing "0" at the Select prompt will return you to the previous menu. You can "back up" to the main menu and even completely out of the system by continuing to press "0" at the select prompt.

CHAPTER 3

REPORT/DISPLAY FUNCTIONS

3. REPORT/DISPLAY FUNCTIONS

Having all the information from the Montana Rivers Study stored in your computer is of little value unless the information can be recovered in a manner usable to the user. The system has a full service reporting function built in to allow you to report the data in numerous ways.

Four reports are available under the current release of the system. These reports are:

1. Value Class Summary By Water Code
2. Value Class Summary By Reach
3. Resource Area Detailed Report
4. Straight File Dump

An example of each of these reports is contained in Appendix C.

3.1. Selecting Records

Obviously, each time that you want to generated a report from the data management system, you don't want to have to list all the data for the entire state. The system has a built in query and index system that allows you to "custom tailor" the reports to your specific needs. By selecting choice "1", "2", or "3" you will be presented with a series of menus and submenus that will allow you to set specific conditions for your report. These conditions are shown in detail in the following section.

3.1.1. The Resource Selection Menu:

The Resource Menu will display only if you have selected the Resource Area Detailed Report or the Straight File Dump. The Resource Menu is the same menu that is used in the File Management Routines. It is reproduced on the following page.

```
Master                    This menu allows you to select one of the
RESOURCE CATEGORY MENU    listed data bases for further querying or
                          editing.  Which of the following Resource
                          Categories do you wish to access?

        1. Fisheries
        2. Wildlife
        3. Natural Features (botanical and specially managed areas)
        4. Natural Features (geological)
        5. Recreation
        6. Cultural Features
        7. Description (For Value Class Reports)
        0. Exit

        Select:
```

Fig. 3-1: The Resource Menu in REPORT mode

If you selected Report Option "4" - Straight File Dump, no more user input is necessary. The system will print the entire contents of the file. Note that some of these files are quite lengthy and that the time required for the complete report is a function of the speed of your printer.

BE SURE YOUR PRINTER IS ON AND READY TO PRINT

The system will prompt you to be sure your printer is on line. However, if you forget to select your printer, the system will fail. At this point you must restart the data management system before continuing.

Most of the report functions have a "bail-out" feature built in. The display will inform you to press the "0"' (zero) key to stop the printing. In a few cases, you will be prompted to use the "ESCAPE" key to terminate the print. This is one of the few times the escape key is active. In all other instances, the Escape key will not terminate the current function.

3.2. Setting the Query Conditions:

A Query Condition is a set of filters that will allow only records meeting the conditions of the filter to be reported. You can think of a filter as a sieve. By defining the parameters that you want, you are setting the "size of the sieve opening" so that only certain size elements will "fall through".

There are numerous choices of predefined query conditions available to you through the data management system. However, the predefined choices may not always meet your needs. If this is the case, the system contains "AD-HOC" query condition options that will allow you to systematically construct a customized query (filter) condition. More discussion of the AD-HOC query generator will follow in a later section.

```
Master                    This menu allows you to select a query
Report/Display            condition to 'filter' the data so that the
SET QUERY CONDITIONS      report will contain only records for specific
                          area(s) of interest.  You may also generate
                          your own Ad-Hoc query condition.

          1. No Filter (List all records).
          2. Geographic Areas.
          3. Value Class.
          4. User Generated Query (restricted).
          5. User Generated Query (unrestricted).
          0. Exit.

          Select:
```

Fig. 3-2: The Query Conditions Menu

(NOTE: For wildlife, if you choose query conditions 2 or 3, the query condition will be applied to DESCRIP.DBF rather than WILDLIFE.DBF).

3.2.1. No Filter (List all records) - "1"

Query condition "1" sets no query conditions, i.e. all records within the data bases are available for reporting purposes. Selection of this option is much the same as the Straight File Dump with the exception that you will be allowed to select the "Order" of the records in a later menu.

3.2.2. Geographical Areas: - "2"

The Geographical Area Selection provides you with numerous sub-menus. These submenus provide you with the choices shown in the figure below.

```
Master                    This menu allows you to specify the
Report/Display            method by which you will access the
Set Query Conditions      state geographically. Select the method
GEOGRAPHICAL              from this menu.

1. All data for the entire state.
2. Data for a specified COUNTY or COUNTIES.
3. Data for specified EPA reaches.
4. Data for specified DFWP water codes.
5. Data for specified USGS hydrological units.
6. Data for specified Townships and Ranges.
0. Exit.

SELECT :
```

Fig. 3-3: The Geographical Menu

3.2.2.1. All data for the entire state: - "1"

The selection of "1" will not generate a query or filter condition. It allows for the listing of all records within the selected data base.

3.2.2.2. County or Counties: - "2"

For sake of example, assume that you want a report that only covers two or three counties in the state. You have previously selected the County Query. Now the display lists all of the Counties in the State preceded by the county number. In the bottom center of the display you see the selection box.

Master
Report/Display
Set Query Conditions
Geographical->COUNTY

This menu allows you to select the county(s) for which you wish to obtain data. Enter "0" to exit or to terminate county input.

1. Silver Bow	15. Lake	29. Rosebud	43. Broadwater
2. Cascade	16. Dawson	30. Deer Lodge	44. Wheatland
3. Yellowstone	17. Roosevelt	31. Teton	45. Prairie
4. Missoula	18. Beaverhead	32. Stillwater	46. Granite
5. Lewis & Clark	19. Chouteau	33. Treasure	47. Meagher
6. Gallatin	20. Valley	34. Sheridan	48. Liberty
7. Flathead	21. Toole	35. Sanders	49. Park
8. Fergus	22. Big Horn	36. Judith Basin	50. Garfield
9. Powder River	23. Musselshell	37. Daniels	51. Jefferson
10. Carbon	24. Blaine	38. Glacier	52. Wibaux
11. Phillips	25. Madison	39. Fallon	53. Golden Valley
12. Hill	26. Pondera	40. Sweet Grass	54. Mineral
13. Ravalli	27. Richland	41. McCone	55. Petroleum
14. Custer	28. Powell	42. Carter	56. Lincoln
			0. Exit

SELECT

Fig. 3-4: The County Selection Sub Menu

The procedure to select one or more counties is quite simple, but you must pay attention or else you may generate a "bogus" filter condition. Don't worry, if you do happen to generate an incorrect query condition, you can go back to the menu and "reconstruct" your query.

Suppose you want the report to include Yellowstone and Stillwater Counties. The procedure that would generate this condition is as follows:

1. Press "3"<cr> (without the quotes) This selects Yellowstone County.

2. Press "32"<cr> (without the quotes) This selects Stillwater County.

3. Press "0"<cr> (zero) (without the quotes) This informs the system that you have completed your selection of counties.

The result of your selection will be displayed on all of the screen displays that follow your selection until such time that they are cleared by you, or you return to the Main menu. Your query condition will look like:

```
SET FILTER TO 'YELL.' $COUNTY .OR. 'STIL.' $COUNTY
```

This query conditions can be interpreted as follows.

> Allow only those records in the data base I previously selected that contain the string 'YELL.' or 'STIL.' in the data field called COUNTY to pass through the filter and be reported. If a data record does not contain either of these counties then do not report them.

3.2.2.3. Data for specified EPA reaches: -"3"

You may specify the range of data by EPA (Environmental Protection Agency) reaches by selecting option "3" from the geographical menu. Selection of this option displays the EPA Reach Menu.

```
Master                    Enter the EPA code: 123
Report/Display            (example: "1701020588000.00")
Set Query Conditions
Geographical->EPA

      Enter EPA Code :
```

Fig. 3-5: The EPA Reach Menu

The EPA reach menu will appear in a slightly different manner than is shown when it is first displayed. You will be asked to input the EPA reach code. If, at this point, you decide to abort this query, enter "0" (zero). You will return to the geographical menu. If you enter an EPA reach code (shown as 123 in the figure above), the program will first "look up" from EPA.DBF the DFWP water code corresponding to the EPA code you've entered. It will then set the filter to that DFWP water code. If several DFWP water codes correspond to the EPA code you've entered, only data for the first one encountered will pass through the filter.

The resulting query condition will be displayed on all future displays until it is canceled in a manner described in the County/Counties discussion.

3.2.2.4. Data for specified DFWP water codes - "4"

You may specify the range of data by DFWP (Department of FIsh, Wildlife and Parks) water codes by selecting option "4" from the geographical menu. Selection of this option displays the DFWP Water Code Menu.

```
Master                      Enter the lower and upper limits for the
Report/Display              DFWP Water Codes for which you wish to
Set Query Conditions        obtain data.
Geographical->WTRCODE

                    Lower DFWP Water Code:  010040

                    Upper DFWP Water Code:  104861
                    <cr> for all after Lower Code.
```

Fig. 3-6: The DFWP Water Code Menu

The DFWP menu will not display exactly as shown in the above figure when it is first displayed. Initially, only the first line asking for the Lower DFWP Code will display. At this point, if you wish to abort the DFWP menu, enter "0" (zero). This will return you to the geographical menu.

3.2.2.5. Data for specified USGS hydrological units - "5"

You may specify the range of data by USGS (United States Geological Survey) hydrological units by selecting option "5" from the geographical menu. Selection of this option displays the USGS Hydrological Units menu.

```
Master                      Enter the lower and upper limits for the
Report/Display              USGS Codes for which you wish to obtain
Set Query Conditions        data.
Geographical->USGSCODE

              Lower USGS Water Code:  1223

              Upper USGS Water Code:  4456
              <cr> for all after Lower Code.
```

Fig. 3-7: The USGS Hydrological Code Menu

The USGS menu will not display exactly as shown in the above figure when it is first displayed. Initially, only the first line asking for the Lower USGS Water Code will display. At this point, if you wish to abort the USGS menu, enter "0" (zero). This will return you to the geographical menu.

3.2.2.6. Data for Specified Townships and Ranges = "6"

You may specify the range of data by Township and Range by selecting option "6" from the geographical menu. Selection of this option displays the Township and Range menu shown on the next page.

```
Master                      This menu will allow you to enter a
Report/Display              range of Townships and Ranges for
Geographical->TOWNSHIP      which you wish to obtain information.

                Southernmost Township is  T1N
                Northernmost Township is  T2N
                Westernmost Range is      R20E
                Easternmost Range is      R21E
```

Fig. 3-8: Specified Townships and Ranges Menu

The Township and Range menu will not display exactly as shown in the above figure when it is first displayed. Initially, only the first line asking for the Southernmost Township will display. At this point, if you wish to abort the USGS menu, enter "0" (zero). This will return you to the geographical menu.

You may enter Townships or Ranges ranging from 1-9 without a leading 0 (zero). That is, the system will translate "T1N" to "T01N" and Range "R5E" to "R05E". The query condition resulting from this geographical menu selection will be quite long due to the method the data is stored within the data sets. Do not be alarmed if the displays following this query condition appear to overwite the borders on the display. This query condition will function correctly.

3.2.3. Value Class:

Selecting the Value Class query option from the Query Conditions Menu will display the Value Class menu. This menu, shown in the following figure, allows you to limit the output to certain limits of the value class assignment. Note that the query condition is sometimes called "OVERALL" in the display.

```
Master                          Enter the limits of the VALUE CLASS
Report/Display                  that you desire. Enter "0" for
Set Query Conditions            only one value class.
Set query conditions->VALUE CLASS


              Enter Lower VALUE CLASS Boundary 1

              Enter Upper VALUE CLASS Boundary 2
```

Fig. 3-9: The Value Class Menu

The Value Class menu will not display exactly as shown in the above figure when it is first displayed. Initially, only the first line asking for the Lower VALUE CLASS Boundary will display. At this point, if you wish to abort the VALUE CLASS menu, enter "0" (zero). This will return you to the geographical menu.

3.2.4. User Generated Query (restricted).

If none of the options available in the menus for query conditions fit the needs of the desired report, the system allows for the construction of an AD-HOC query condition. You may enter these ad-hoc queries in two different ways. This choice allows you to use menus to construct an ad-hoc query. The next choice allows you to type in your query directly in dBase III code. The second choice, described below, is recommended for most queries; although it requires you to understand some dBase III code, it allows you to construct very powerful boolean search conditions.

Because you and not the system are constructing the query, you must obey certain grammatical rules for your AD-HOC query to function. For example, dBASE III allows what is known as a "substring" search". You have seen the construction of a substring search in the County Query. The operator for a substring search is the "$". The use of this search condition requires precise grammatical construction.

For example, suppose you wish to search the field "STATUS" in the Natural Features data base for the condition "RNA". The actual query condition command would be:

SET FILTER TO 'RNA' $STATUS

The data management system will construct the actual command for you, however, it WILL NOT supply the proper punctuation, you must do this yourself. Another example may be that you want to create a query condition such that only records in Missoula county with a value class less than 2 are reported. The query condition would be similar to:

SET FILTER TO 'MISS.' $COUNTY .AND. OVERALL <"2"

Again, the system AD-HOC query generator will construct the correct command IF you supply the proper punctuation.

In General, the system will not supply single quotes "'" or parentheses "()".

NOTE: DO NOT USE THE DOUBLE QUOTATION MARK ' " '

The data management system will accept them in the AD-HOC construction, but will abort the system if they are used!

Values that are acceptable to the AD-HOC query generator will be displayed in the lower section of the display. These fields are the variables identified as the query condition variables. Be careful in the spelling. An incorrect field name will not function correctly.

An example of the figures depicting a typical AD-HOC query input screen is on the following page.

```
FILTER COMMAND GENERATOR

This portion of the routine allows you to set a filter condition for
the particular file you have selected.  You may bypass the routine by
entering "ALL" for the FIELD input.  You may end your input by
pressing the return key in the CONNECTION input area.

PLEASE WAIT.....
```

Fig. 3-10: The AD-HOC Query Introduction Screen

```
:-------------------------------------------------------------:
: LINE |  FIELD  |  OPERATOR |    EXPRESSION    |  CONNECTION  : FIELD 1 =
:-------------------------------------------------------------: 'ALL' TO
:  1   |         |           |                  |              :   EXIT
:-------------------------------------------------------------:
:  2   |         |           |                  |              : '<CR>' IN
:-------------------------------------------------------------:CONNECTION
:  3   |         |           |                  |              :  TO END
:-------------------------------------------------------------:
:  4   |         |           |                  |              :
:-------------------------------------------------------------:
:  5   |         |           |                  |              :
:-------------------------------------------------------------:
-------------------------------------------------------------------------
:CODE      :RIV_NAME     :REGION      :TRS       :COUNTY    :EPA_NO    :TRIB_TO:
:HYD_UNIT :FNL_WILD     :FNL_FISH    :FNL_FOOR :FNL_NAT   :FNL_GEO   :FNL_REC:
:OVERALL   :            :            :          :          :          :       :
-------------------------------------------------------------------------
```

Fig. 3-11: A Typical AD-HOC Query Generation Input Screen

Presently, no error checking is built into the system. Carefully review each input element before confirming the input with <cr>. If however, your AD-HOC query appears in error on previous screens, simply return to the AD-HOC menu and reconstruct the query.

3.2.5. User-generated Query (unrestricted).

If you select this choice, you will be presented with a screen prompting you to enter a query condition that may be up to 254 characters long. Although you are limited by the grammatical rules of dBASE III, you may perform some very powerful and complex boolean searches...for example, you can search for all streams in Gallatin or Madison County that have value class assignments of 1 for both fisheries and recreation, or you can search for all natural features that are designated as either National Natural Landmarks or Research Natural Areas but do not have a value class of 2.

Some of the basic rules of dBASE III grammar you'll need to know are as follows:

Logical Operators.

Conditions can be linked together with the following logical operators:

(A) .OR. (B)	records meeting either condition (A) or (B)
(A) .AND. (B)	only records meeting both conditions (A) and (B)
(A) .AND. .NOT. (B)	only records meeting condition (A) and not meeting condition (B)

Make sure that periods are placed both in front of and behind the logical operators; they are an essential part of the code.

Substring Searches.

In dBASE III, the dollar sign ("$") means "is contained in." for example,

```
"YELL" $COUNTIES
```

means "the character string 'YELL' is contained in the field called 'COUNTIES.' Notice that the substring you are searching for must be contained in quotation marks. If these quotation marks are not included, the query won't work.

Conversion to upper case.

if you're not sure if the substring you're searching for within a field is in upper case, lower case, or mixed, convert the field contents to upper case as follows:

```
"YELL" $UPPER(COUNTIES)
```

This will retrieve the record whether the county name has been entered as "Yell," "yell," or "YELL".

Substring operation

Sometimes you are only interested in part of a field, e.g., the first two digits of the water code designate the drainage, and you may be interested in these two only. The substring operation is used to select a substring from a field, for example, for the code "021476,"

```
SUBSTR(CODE,1,2) = "02"  (displays two characters beginning with the
                          first)

SUBSTR(CODE,4,3) = "476"  (displays three characters beginning with
                           the fourth)
```

Conversion from character to numeric.

Most fields in the Montana Rivers Study data bases are either "character" (that is, they're treated simply as character strings) or "numeric" (that is, only numbers are allowed and they're treated a special way). Although a character field may contain only numbers, as with the "CODE" field, you cannot treat them as numbers (that is, you cannot perform calculations or comparisons on them) unless they are first converted to numeric. This is done using the "VAL()" function. For example, the following shows an incorrect way and the

correct way to search for all codes falling between the values "020000" and "030000."

INCORRECT: CODE>20000 .AND. CODE<30000

CORRECT: VAL(CODE)>20000 .AND. VAL(CODE)<30000

Conversion from Numeric to Character.

To convert a numeric value to a character string, use the "STR" function, e.g., STR(EAGLE).

The string returned actually has ten characters to the left of the decimal, so if you wish to search for an exact match, you must select a substring of the string. For example, the following two operations involving the one-digit numeric field "EAGLE" are equivalent.

```
EAGLE=2
SUBSTR(STR(EAGLE),10,1)="2"
```

Parentheses.

Make sure that all multiple conditions are enclosed in parentheses, and that all pairs of parentheses match. If there are unmatched parentheses, the query will not work. The following is an example of a faulty and a corrected complex query condition:

INCORRECT: VAL(SUBSTR(CODE,1,2)<10 .AND. "YELL" $UPPER(COUNTIES)

CORRECT: VAL(SUBSTR(CODE,1,2))<10 .AND. "YELL" $UPPER(COUNTIES)

3.3. Report Formats and Report Order

After the completion of the query condition input, you are allowed to specify the Report Format and Report Order. Again, the display will allow you an array of choices.

```
Master                This menu allows you to specify the format and
Report/Display        the method the data you select is presented.
REPORT ORDER MENU     All selections will report the complete entry
                      for each river in the selected area in one of
                      the following formats.  Select the format now.

                A. Water Code (or Normal Index).
                B. River Name.
                C. EPA Reach.
                D. USGS Code + River Name.
                E. Value Class + River Name.
                F. Value Class + Water Code.
                G. Value Class + EPA Reach.
                H. Value Class + USGS Code.
                I. User Generated (AD_HOC) Index.
                O. Previous Menu.
                SELECT:
```

Fig. 3-12: The Report Order Menu

Most of the Report Order selections are self explanatory. In some cases, depending on the database selected, not all of the selections shown will be available. Make your selection from the available reports displayed on the screen.

Of particular interest is menu selection "I" - User Generated AD-HOC Index. This function operates in a manner similar to the AD-HOC query generator.

```
AD-HOC INDEX GENERATOR

     This portion of the routine allows you to generate an AD-HOC index
     for the particular file you have selected.

     PLEASE WAIT.....
```

Fig. 3-13: The AD-HOC Index Generator Screen

```
     :--------------------:
     : PRIORITY |  FIELD  :   Enter the name of the field (or fields)
     :--------------------:   on which you wish to index.
     :    1     |         :
     :--------------------:
     :    2     |         :
     :--------------------:
     :    3     |         :
     :--------------------:
     :    4     |         :
     :--------------------:
     :    5     |         :
     :--------------------:

-------------------------------------------------------------------------
:CODE      :RIV_NAME  :REGION    :TRS       :COUNTY    :EPA_NO    :TRIB_TO:
:HYD_UNIT :FNL_WILD  :FNL_FISH  :FNL_FOOR  :FNL_NAT   :FNL_GEO   :FNL_REC:
:OVERALL  :          :          :          :          :          :       :
-------------------------------------------------------------------------
```

Fig. 3-14: The AD-HOC Index Generation Input Screen

3.4. Report Control Menus

Many of the reports that can be generated have a print control screen. The screen may vary in appearance, but the overall function of the screen menu is the same. Unless otherwise directed, in the print mode, pressing "0" (zero) will terminate the printing and return you to the report format menu.

The following is an example of the report control menu.

```
-------------------------------------VALUE CLASS ASSIGNMENT SUMMARY------
Master
Report/Display
No query conditions

INDEX ON WATER CODE (or Normal Index) TO DESCRIP1

                    REPORT TO (P)RINTER, (S)CREEN (E)xit
```

Fig. 3-15: A typical Report Control Menu

```
Master
Report/Display
No query conditions

INDEX ON WATER CODE (or Normal Index) TO DESCRIPI

                REPORT TO (P)RINTER, (S)CREEN (E)xit  P

                        *** PRINTING ***
                    Press "0" to terminate print

                        * * *  E N D  * * *
```

Fig. 3-16: A Typical Report Control Screen during print

CHAPTER 4

FILE MANAGEMENT FUNCTIONS

4. FILE MANAGEMENT FUNCTIONS

4.1. "A" (EDIT/ADD/DELETE RECORD)

NOTE: **This section is intended only for use by data managers. In order to preserve the integrity of the data files these functions have been disabled on all copies of the system except those at NRIS and DFWP's Helena offices.** If you see any records that need changing, please keep a list of them (use "Shift-PrtSc" to print a copy of the record) and provide them to the appropriate senior resource expert (Appendix D). Your changes will thus be provided to all users of the system.

This selection allows numerous file management functions to be performed on the data bases within the system. New records can be ADDed to a data base (and automatically update the associated data files and ranking matrix); EDIT an existing record within the data bases (and automatically update the associated data files and ranking matrix); or mark a record for deletion from a database. The marking for deletion from a data base does not physically remove the record, but merely marks it as deleted. A deleted record will not be utilized in any of the report functions of the data management program.

After selecting "A", Edit/Add/Delete a Record, the RESOURCE menu will display on the screen. Note that the upper left corner of the menu is building you a "map", letting you know where you have been. This "map" will follow you through the entire system and at times will display query selections, filter options and index options that you have selected through the course of the menus.

The RESOURCE menu, shown below lists the data bases that are available to you for file management. As you can see, an asterisk appears in line seven. There is a special data base named DESCRIP.dbf that is automatically maintained by the system. Users should not attempt to edit this data base as the reports all utilize this data base as an "internal" road map. Changing this data base destroys this map and the DESCRIP data base will have to be rebuilt, a long and time consuming procedure.

```
Master                      This menu allows you to select one of the
RESOURCE CATEGORY MENU      listed data bases for further querying or
                            editing. Which of the following Resource
                            Categories do you wish to access?

      1. Fisheries
      2. Wildlife
      3. Natural Features (botanical and specially managed areas)
      4. Natural Features (geological)
      5. Recreation
      6. Cultural Features
      *  ------------------------
      0.   Exit

      Select:
```

Fig. 4-1: The Resource Menu

4.1.1. Edit:

After you have selected the RESOURCE data base, the console screen will clear and you will be asked for the "KEY" of the record you wish to edit. All of the data bases within the system are keyed on the record field "CODE". Because some of the data bases may have more than one record with the same "CODE" you will be presented with a full screen list of records beginning with the code you selected and listing records below (increasing code number).

```
          Master
          Resource
          EDITOR-> FISH.dbf

     Please enter six-digit water code for the stream you wish to
access.  Do not include hyphens.  Example "013280"

                          Enter "0" (zero) to exit.
```

Fig. 4-2: The Edit Prompt Screen

After you have selected the "water code" for the record that you want, the record selection screen will be displayed. The record number matching the first occurrence of the water code will automatically be displayed in the WHICH RECORD query on the lower left of the screen. If this is the record that you want to edit, press return. If, however, the record number does not indicate the record you wish to edit, enter the correct record number and press return.

```
     Record#     CODE        RIV_NAME                        FINAL_VAL
     228         014860      MEDICINE LODGE CREEK                3
     299         014940      M FK BLACKTAIL DEER CREEK           4
     385         015020      MILL CREEK                          4
     386         015020      MILL CREEK                          4
     1657        015160      MUDDY CREEK                         1
     488         015210      NARROWS CREEK                       2
     325         015220      NICHOLIA CREEK                      4
     1658        015400      N FK DIVIDE CREEK                   2

-------------------------------------------------------------------------
     WHICH RECORD 228   N- NEXT PAGE   P- PREVIOUS PAGE   "0"  - EXIT
```

Fig. 4-3: The Record Selection Screen

If the record you seek is not among those displayed on the screen, you can either page forward or backward by pressing either the "N" or "P" (Next or Previous page) followed by <cr>. If you are at or near the end of the file, and select the "N" option, the screen will display all of the remaining records it can on the screen. In addition, the message "END OF FILE" will be displayed in place of the N- NEXT PAGE prompt. If you again press "n", don't be surprised if you get a blank screen. Pressing "N" again will restore it.

After the record number is entered, the console screen will again clear and the particular record that you selected will be displayed in a format that is conducive to editing.

The next screen displays a portion of the record. This is to allow you to take one of three actions:

1. Edit the record.
2. Recall a deleted record.
3. Delete the current record.

Make your choice from one of the three options.

```
Record No. 228       EDIT THE FISH DATA BASE        OVERVIEW
-------------------------------------------------------------
CODE          014860
RESOURCE      F
REACH         AH9
RIV_NAME      MEDICINE LODGE CREEK
SECTION       002
LOWER         IRRIGATION DIVERSION
UPPER         AYERS CANYON
TRS           T10SR11W08BBAD
REGION        3

(E)dit (R)ecall, (D)elete this record
```

Fig. 4-4: The Edit Overview Screen

A typical edit screen is shown below. The cursor indicates the field that is currently being edited. You may use all of the cursor keys and the <cr> key to move through the record. Note the instruction at the bottom of the page. It is how you can page through a multi page edit, Save the changes you have made to certain fields within the record, or abort the edit .

To edit a record, position the cursor in the field you wish to edit. Move the cursor to the beginning of the field and press ^Y (Control + Y). This will erase the data contained in the field. Enter the new data.

```
Record No. 228       EDIT THE FISH DATA BASE     Page 1 of 1
-------------------------------------------------------------
CODE         014860
RESOURCE     F
REACH        AH9
RIV_NAME     MEDICINE LODGE CREEK
SECTION      002
LOWER        IRRIGATION DIVERSION
UPPER        AYERS CANYON
TRS          T10SR11W08BBAD
REGION       3
COUNTY1      BEAV
COUNTY2
COUNTY3
COUNTY4
COUNTY5
LENGTH       28.2
VALUE_A      3
VALUE_B      3
VALUE_C      4
VALUE_D
-------------------------------------------------------------
Press "PgDn" to move thru or save record.
```

Fig. 4-5: A Typical Edit Screen

WARNING: On many computer keyboards, the numeric keypad provides two functions. The first function, as the name implies, is to allow for the rapid entry of numerical (0-9) data. The other function, and the function you will be using most of the time, is for cursor position control. The function or mode of the keypad is controlled by the "Num Lock" key which is located above the keypad. On some keyboards, there is a small LED which will illuminate if the keypad is in the numeric mode. Other keyboards, like the IBM PC give you no indication whatsoever as to the current mode of the keypad. dBASE III has recognized this shortfall and it will tell you not only the status of the numeric keypad, but also if the "Caps Lock" is engaged, if the "Scroll Lock" is engaged or if you are in the "Ins" (Insert) mode.

In order for the edit function to work correctly, the keypad must be in the "cursor control mode". Additionally, the "Scroll Lock" should not be engaged.

The data you have just entered is not recorded in the data base until you specifically instruct the program to "S"ave the changes. You accomplish this by the following actions.

1. Pressing the "PgDn" key.

2. Pressing "S" for save.

When you save a record, there will be a brief pause. This is normal. A lot is happening with the information you just entered. The five county names are regrouped and stored into a field called COUNTY (you cannot edit this field). The Final Value for the record is re-computed with the result being saved in the field called FINAL_VAL (another field that you cannot edit). Finally, the DESCRIP.dbf data base is updated to reflect any changes that are appropriate from the data base you are editing.

If you use the editor to make changes to the data and later discover the changes you made were in error, you must re-edit the record to correct the data that is in error.

To exit from the edit routine, simply enter "0" at the KEY prompt. You will return back through the menus.

4.1.2. Add:

New records are added to the data base by entering a unique key. If the editor does not find the record you are requesting, you will be asked whether or not you wish to add a new record. If you have mistakenly entered an incorrect key, press "N". You will return to the KEY entry screen.

If you answer "Y" a blank record similar in format to the edit screen will display. Using a prepared data entry sheet, enter the data in the precise order in which the cursor prompts. You can move about on a particular screen, but you cannot page back and forth. If you do make a mistake simply edit the record after it is saved by the add routine.

4.1.3. Delete:

As you have seen, the delete function is actually contained within the Edit function. By selecting (D)elete from the edit overview routine, the record is automatically deleted. You can tell if a record has been marked for deletion by observing the upper right center of the screen. If the word "Deleted" is visible, and flashing, the record has been marked for deletion.

If you have mistakenly marked a record for deletion, you can "recall" if any time prior to "Packing" the data base. (More on Packing later). To "undelete" a record, select the (R)estore option from the edit overview screen. The record will be undeleted. The routine goes directly into the edit mode to allow any changes that you may want to make. After making any changes press "PgDn" and (S)ave the record.

You can also determine which records are marked for deletion whenever you select a KEY and the 20 line record display is on the screen. Any record that is marked for deletion will have an "*" displayed near the record number.

4.2. "B" Update Record (Batch):

NOTE: At the time of this release, the Batch Update routine has not been written or incorporateed into this system.

This selection will allow you to do a "batch" update of the selected data base. "Batch Update" simply means that all of the additions or corrections to be made to the data base have been compiled into a separate data base file with the same file structure and that we will let dBASE III find the correct record and replace existing data with new data or add new records to the data base.

Batch updating has some particular advantages. First, you can review and edit the "update" file to insure that all data is correct. Second, you can do the batch update at a time when computer usage is slow, thereby allowing more users time on the computer.

At the time of this release, the Batch Update routine has not been written or incorporated into this system.

4.3. "C" Pack File:

This selection allows you to "Pack" a selected data base file. The selected data base file is selected from the RESOURCE menu in a manner similar to that explained under the Add/Edit/Delete function. Note that an additional option is now available to you. You can "Pack" all of the data bases with one operation, the "ALL option".

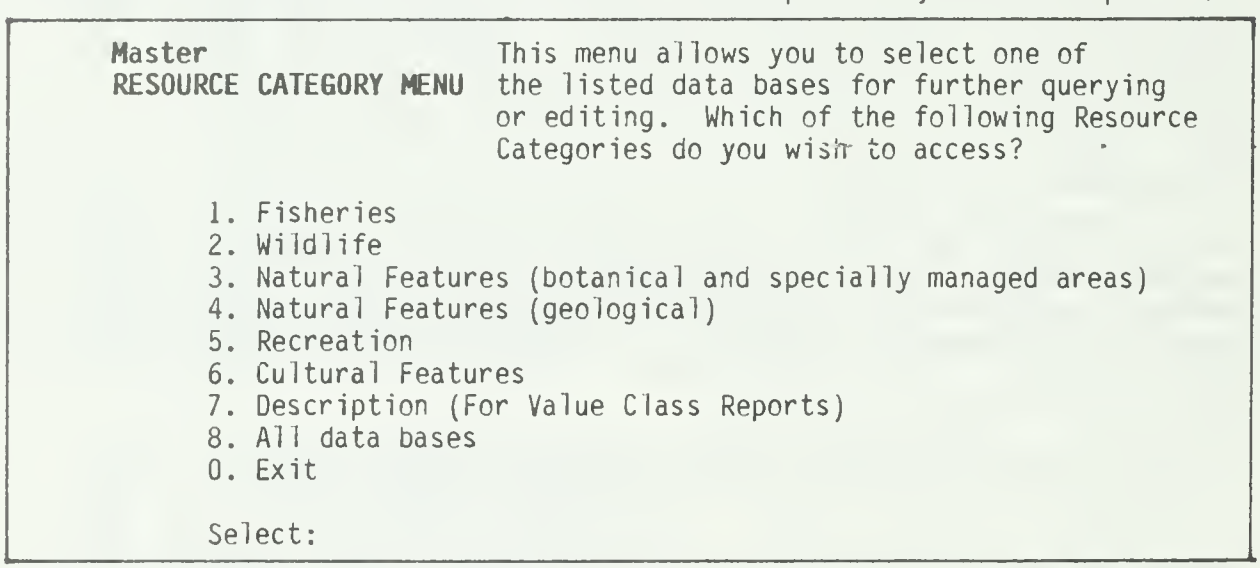


Fig. 4-6: The Resource Menu in PACK mode

"Packing" a data base permanently removes the record from the data base, i.e. it is gone forever. Only those records marked for deletion are removed from the data base. Therefore, it is in your best interest to review the data base file prior to running the pack operation, as it is much easier to "undelete" a record than it is to re enter the entire record. The "Pack" routine will ask you if you want a list of records

marked for deletion prior to packing the file. In some cases, depending on the size of the data base file, not all of the information contained in the data base will be reported. However, sufficient data will be displayed to allow you to determine whether or not the record should be deleted and removed from the data base file.

If you discover that a record is marked for deletion that you do not want to delete, abort the pack operation and select the "Add/Edit/Delete" operation from the MASTER MENU. Again select the data base from the RESOURCE Menu, edit the particular record and undelete it with the "R" keystroke. You can repeat the undelete operation as many times as necessary until only the records you want deleted remain marked for deletion. You can now select the "Pack" option from the MASTER menu and complete the "Pack" operation.

During the pack operation, the console will report the progress of the operation. You will also see a message line reporting the status of the index file(s). These index files are part of the system that allow you rapid access to any record within the system. The index must be rebuilt after a "Pack" operation to maintain the integrity of the index and to allow you to be able to find records in the future. When the packing operation is complete, program control will return to the MASTER menu.

4.4. "D" Reindex File:

All of the data base files have standard index files associated with them These index files are "maintained indexes", that is the are automatically updated when records are added to the data base. There are some cases, however, when a data base index will become "confused". The system allows you to easily reconstruct the index if you suspect this misalignment has occurred.

By selecting the "Reindex File" option, and selecting the appropriate data base, the system will reconstruct the data base index. Again, like the "Pack" routine you have the option of re indexing "ALL" of the data bases. No further user intervention is required. When the reindexing operation is complete, program control will return to the MASTER menu.

APPENDIX A

DATA BASE FILE STRUCTURES

APPENDIX A
FILE STRUCTURES

A.1. Data Base Files:

Table A-1 lists and briefly describes the database files contained in the Montana Rivers Study data base.

Table A-1: DATA BASE FILES

1.	DESCRIP.DBF	This is the MASTER data base containing a summary of all information contained in the other data bases. Every water code for which there is information is represented by a record in this data base, with the name of the stream, various geographical descriptors, and the value class assignments for each resource category. This file is the authority for names associated with water codes and for the geographical descriptors of the streams.
2.	FISH.DBF	This is the fisheries data base. It is a subset of the much larger DFWP interagency stream data base. Each water code may have more than one reach code assigned to it, so the number of records in this data base is larger than the number of water codes.
3.	REC.DBF	This is the recreation data base. Each river may have more than one reach code assigned to it, so the number of records contained in this data base is larger than the number of water codes rated.
4.	GEO.DBF	This is the geological features data base. Many individual sites may correspond to a single water code; each site is given a unique "reach" number although the sites are not really "reaches".
5.	NAT.DBF	This is the natural features data base (including botanical and specially managed biological sites). Its structure is identical to that of GEO.DBF.
6.	FOOR.DBF	This is the cultural features data base. Each river may have more than one reach code assigned to it, so the number of records contained in this database is larger than the number of water codes rated.
7.	WILDLIFE.DBF	This is the wildlife data base. It is a subset of a much larger data base managed by DFWP. This file contains information for each of the 354(??) wildlife areas into which the state has been divided by DFWP. Each of these areas contains many streams corresponding to many water codes. The wildlife areas and the water codes are related by the following file, AREACODE.DBF.

8. AREACODE.DBF — Records in this file contain only two fields: a water code, and the wildlife area code corresponding to that water code.

9. COUNTY.DBF — This file is a lookup table relating county names to the 3-digit county codes used in the fisheries data base.

10. EPA.DBF — This file is a lookup table relating DFWP water codes to EPA codes.

The following tables list the Field Names, Field Types, Field Width, Decimal allocation, and field definitions for the Montana Rivers Study data base files.

A.1.1. DESCRIP.DBF

DESCRIP.dbf Alias: DESCRIP
Master index file: DESCRIP.ndx Key: CODE + RIV_NAME

Structure for database: DESCRIP.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RIV_NAME	C	30	River name (as contained in DFWP water code catalog)
3	REGION	C	1	DFWP administrative region
4	TRS	C	14	Legal description of lower boundary
5	LOWER	C	30	Verbal description of lower boundary
6	UP_TRS	C	14	Legal description of upper boundary
7	UPPER	C	30	Verbal description of upper boundary
8	COUNTY	C	25	Counties crossed by the river or stream
9	TRIB_TO	C	25	Name of stream into which this one flows
10	HYD_UNIT	C	8	USGS hydrologic unit code
11	LENGTH	N	5(1)	Length in kilometers
12	USFS_FOR	C	15	USFS National Forest
13	USFS_DIS	C	15	USFS Forest District
14	FNL_WILD	C	1	Final wildlife value class assignment
15	FNL_FISH	C	1	Final fisheries value class assignment
16	FNL_FOOR	C	1	Final cultural value class assignment
17	FNL_NAT	C	1	Final natural features (botanical, specially managed) value class assignment
18	FNL_GEO	C	1	Final geological features value class assignment
19	FNL_REC	C	1	Final recreation value class assignment
20	FINAL_VAL	C	1	Final overall value class assignment (this is equal to the highest value class assignment received for any one of the individual resource categories)
** Total **			226	

A.1.2. FISH.dbf

FISH.dbf Alias: FISH
Master index file: FISH.ndx Key: CODE + FINAL_VAL

Structure for database: FISH.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RESOURCE	C	1	"F" for all records (to indicate fisheries)
3	REACH	C	3	A unique 3-character identifier (called the "serial" in the interagency fisheries data base) for the segment rated
4	RIV_NAME	C	30	Name of river or stream
5	SECTION	C	3	Describes which section of the water code is being rated in this record
6	HYD_UNIT	C	11	USGS hydrologic unit code
7	LOWER	C	30	Description of lower reach boundary
8	UPPER	C	30	Description of upper reach boundary
9	TRS	C	14	Legal description of lower boundary
10	UP_TRS	C	14	Legal description of upper boundary
11	USFS_FOR	C	2	Code for USFS National Forest (see Appendix B.1)
12	USFS_DIST	C	2	Code for USFS Forest District (see Appendix B.1)
13	TRIB_TO	C	30	Tributary to
14	REGION	C	1	DFWP administrative region
15	COUNTY	C	25	Counties crossed by the river or stream (this field is a concatenation of the following five which list individual counties crossed)
16	COUNTY1	C	4	
17	COUNTY2	C	4	
18	COUNTY3	C	4	
19	COUNTY4	C	4	
20	COUNTY5	C	4	
21	LENGTH	N	5(1)	Length of reach (kilometers)
22	VALUE_A	C	1	Resource value
23	VALUE_B	C	1	Sport Fishery value
24	VALUE_C	C	1	Habitat and Species value
25	VALUE_D	C	1	(blank)
26	FINAL_VAL	C	1	Final fisheries value class (equals highest value class assigned for resource value, sport fishery value, or habitat and species value) (1=Unique or Outstanding; 2=Substantial; 3=Moderate; 4=Limited; U=Unknown or unclassified)
** Total **			233	

A.1.3. REC.dbf

REC.dbf Alias: REC
Master index file: REC.ndx Key: CODE + FINAL_VAL

Structure for database: REC.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RESOURCE	C	1	"R" for all records (to indicate recreation)
3	REACH	C	4	Segment or reach rated
4	AGENCY	C	1	Agency rating the reach (1 = DFWP only; 2 = BLM only; 3 = USFS only; 4 = DFWP and USFS; 5 = DFWP and BLM; 6 = BLM and USFS; 7 = all 3 agencies)
5	RIV_NAME	C	30	River name
6	SEG_NAME	C	15	Segment name
7	UP_BOUND	C	15	Description of upper boundary
8	LO_BOUND	C	15	Description of lower boundary
9	LENGTH	C	2	Length (in ---?)
10	DFWP_REGN	C	1	DFWP administrative region
11	WATER_CHAR	C	1	Water character (1 = flat; 2 = flat/minor rapids; 3 = minor rapids; 4 = minor/moderate rapids; 5 = moderate rapids; 6 = moderate/major rapids; 7 = major rapids; 8 = not boated)
12	MNTH_BTBL	C	1	No. of months per year boatable (9 = 9 or more months)
13	MOTOR_BOAT	C	1	Use for motor boating (1 = primary activity; 2 = secondary activity)
14	CANOE	C	1	Use for canoeing (1 = primary activity; 2 = secondary activity)
15	KAYAK	C	1	Use for kayaking (1 = primary activity; 2 = secondary activity)
16	RAFT	C	1	Use for rafting (1 = primary activity; 2 = secondary activity)
17	TUBING	C	1	Use for innertubing (1 = primary activity; 2 = secondary activity)
18	SWIMMING	C	1	Use for swimming (1 = primary activity; 2 = secondary activity)
19	BOAT_FISH	C	1	Use for boat fishing (1 = primary activity; 2 = secondary activity)

REC.dbf Alias REC. (continued)

20	SHORE_FISH	C	1	Use for shore fishing (1 = primary activity; 2 = secondary activity)
21	EXTRA_1	C	2	Other land and water based activities (see Appendix B.2)
22	EXTRA_2	C	2	Other land and water based activities (see Appendix B.2)
23	TENT_CAMP	C	1	Use for tent camping (1 = primary activity; 2 = secondary activity)
24	CAR_CAMP	C	1	Use for car camping (1 = primary activity; 2 = secondary activity)
25	TRAIL_USE	C	1	Use by trailers (1 = primary activity; 2 = secondary activity)
26	MOTOR_TRAI	C	1	Use for motor trailers (1 = primary activity; 2 = secondary activity)
27	DRIVING	C	1	Use for driving (1 = primary activity; 2 = secondary activity)
28	VIEWING	C	1	Use for viewing (1 = primary activity; 2 = secondary activity)
29	PICNIC	C	1	Use for picnicing (1 = primary activity; 2 = secondary activity)
30	EXTRA_3	C	2	Other land and water based activities (see Appendix B.2)
31	EXTRA_4	C	2	Other land and water based activities (see Appendix B.2)
32	USE_LEVEL	C	5	Approximate use level, if data are available
33	UNITS	C	1	Units for use level (1 = visits; 2 = visotor days; 3 = other unit)
34	USE_ESTIMA	C	1	Use estimate (1 = heavy; 2 = heavy/moderate; 3 = moderate; 4 = moderate/low; 5 = low)
35	ACCESS	C	1	Access rating (1 = abundant access; 2 = abundant/moderate; 3 = moderate; 4 = moderate/limited; 5 = limited; 6 = limited/restricted; 7 = restricted; 8 = other)

REC.dbf Alias REC. (continued)

36	ROS_CLASS	C	1	Recreation opportunity spectrum class (1 = primitive; 2 = primitive/semiprimitive; 3 = semiprimitive; 4 = semiprimitive/transitional; 5 = transition; 6 = transitional/rural; 7 = rural; 8 = rural/urban; 0 = urban)
37	SCENIC_QUA	C	1	Scenic quality (1 = outstanding; 2 = outstanding/substantial; 3 = substantial; 4 = substantial/moderate; 5 = moderate; 6 = moderate/limited; 7 = limited)
38	NO_SITES	C	1	Number of developed recreation sites along this reach
39	VALUE_A	C	1	DFWP value class (1=outstanding; 2=substantial; 3=moderate; 4=limited; U=unknown or unclassified)
40	VALUE_B	C	1	BLM value class (as above)
41	VALUE_C	C	1	USFS value class (as above)
42	FINAL_VAL	C	1	Final value class (as above; equals the highest value class assignment in any of the above three categories)
43	REASON1	C	2	Additional reasons given for value class assignment (Appendix B.3)
44	REASON2	C	2	(as above)
45	REASON3	C	2	(as above)
46	REASON4	C	2	(as above)
47	REASON5	C	2	(as above)
48	REASON6	C	2	(as above)
49	REASON7	C	2	(as above)
50	REASON8	C	2	(as above)
51	REASON9	C	2	(as above)
52	REASON10	C	2	(as above)
** Total **			150	

A.1.4. GEO.dbf

GEO.dbf Alias: GEO
Master index file: GEO.ndx Key: CODE + FINAL_VAL

Structure for database: GEO.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RESOURCE	C	1	"G" for geological, "N" for other natural (botanical, specially managed)
3	REACH	C	4	Site number
4	SITENAME	C	40	Site name
5	TYPE1	C	20	Type of feature
6	TYPE2	C	20	Type of feature
7	TYPE3	C	20	Type of feature
8	STATUS	C	40	Special designation, management status or institutional constraint
9	COUNTY	C	25	Counties in which the site is located (concatenation of the following five fields)
10	COUNTY1	C	4	
11	COUNTY2	C	4	
12	COUNTY3	C	4	
13	COUNTY4	C	4	
14	COUNTY5	C	4	
15	USGSNO	C	8	USGS Hydrologic Unit Code
16	RIV_NAME	C	30	River name
17	MIMIN	C	6	River mile at lower boundary
18	MIMAX	C	6	River mile at upper boundary
19	QUADNAME1	C	35	Name of USGS quad on which site is located
20	Y1	C	2	Year of above quad map
21	SC1	C	3	Scale of above quad map
22	QUADNAME2	C	35	Name of second USGS quad (if more than one)
23	Y2	C	2	Year of above quad map
24	SC2	C	3	Scale of above quad map
25	Q	C	1	Number of additional quad maps on which site occurs
26	BLM	C	3	Map number of BLM 1:100,000 map on which site occurs
27	TN	C	2	Number of northernmost township
28	G	C	1	N or S?
29	TX	C	2	Number of southernmost township
30	T	C	1	N or S?
31	RN	C	2	Number of easternmost range
32	Y	C	1	E or W?
33	RX	C	2	Number of westernmost range
34	R	C	1	E or W?
35	LEGAL	C	55	Sections (or additional legal descr.)
36	LATMIN	C	6	Southernmost latitude (degrees, minutes, seconds)

GEO.dbf Alias GEO (continued)

37	LATMAX	C	6	Northernmost latitude (degrees, minutes, seconds)
38	LONGMIN	C	7	Easternmost longitude (degrees, minutes, seconds)
39	LONGMAX	C	7	Westernmost longitude (degrees, minutes, seconds)
40	LATILONG	C	2	Latilong containing site
41	DESCRIPT1	C	254	Narrative description
42	DESCRIPT2	C	100	Description (continued)
43	SOURCES	C	200	Sources of information on site
44	ACCURACY	C	1	How accurately is site located? (A = to nearest 1/4 section; B = to nearest section; C = to nearest township; D = to nearest county)
45	VALUE_A	C	1	Value class assignment for uniqueness
46	VALUE_B	C	1	Value class assignment for previous designation or listing
47	VALUE_C	C	1	Value class assignment for public and recreational use
48	VALUE_D	C	1	Value class assignment for scientific reference value
49	FINAL_VAL	C	1	Final value class assignment (equals highest value class received in any of the above four ratling categories)
** Total **			985	

A.1.5. NAT.dbf

NAT.dbf Alias: NAT
Master index file: NAT.ndx Key: CODE + FINAL_VAL

Structure for database: NAT.dbf

(The structure of this file is identical to that of GEO.DBF)

A.1.6. FOOR.dbf (Cultural data base)

FOOR.dbf Alias: FOOR
Master index file: FOOR.ndx Key: CODE

Structure for database: FOOR.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RESOURCE	C	1	"C" for all records (to indicate cultural)
3	REACH	C	4	Segment rated
4	MAP_NAME	C	20	Name of BLM 1:100,000 map on which segment is shown
5	RIV_NAME	C	35	Name of river or stream
6	VALUE_A	C	1	Value class assignment
7	VALUE_B	C	1	(blank)
8	VALUE_C	C	1	(blank)
9	VALUE_D	C	1	(blank)
10	FINAL_VAL	C	1	Final cultural value class assignment
11	UP_TWP	C	3	Township of upper segment boundary
12	UP_RAN	C	4	Range of upper segmant boundary
13	UP_SEC	C	3	Section of upper segment boundary
14	LO_TWP	C	3	Township of lower segment boundary
15	LO_RAN	C	4	Range of lower segment boundary
16	LO_SEC	C	3	Section of lower segment boundary
** Total **			91	

A.1.7. WILDLIFE.DBF

WILDLIFE.DBF Alias: WILDLIFE
Master index file: AREA.NDX Key: AREA

Structure for database: WILDLIFE.DBF

Field	Field Name	Type	Width	Description
1	HYDRUN	C	8	USGS Hydrological unit
2	REG	C	1	DFWP administrative region
3	DRA	C	4	DFWP drainage code (see Appendix B.4)
4	AREA	C	3	Unique wildlife area identification code (all start with J)
5	NAME	C	37	Wildlife area name
6	LOWBOUN	C	27	Lower boundary of wildlife area
7	UPBOUND	C	27	Upper boundary of wildlife area
8	TYPE	C	1	Wildlife area river/land type (M = mainstem; B = basin; T = tributaries of mainstem)
9	TRIBTO	C	20	River to which the streams within the wildlife area are tributaries
10	TRIBDR	C	4	Drainage code for above
11	CONFL_RM	C	6	River mile of wildlife area confluence
12	CONFLLEG	C	10	Legal description of wildlife area confluence

WILDLIFE.dbf Alias: WILDLIFE (continued)

13	LOWRM	C	6	River mile of wildlife area lower boundary
14	UPRM	C	6	River mile of wildlife area upper boundary
15	LOWLEG	C	10	Legal description of wildlife area lower boundary
16	LOWUTMX	C	6	UTMX coordinate of wildlife area lower boundary
17	LOWUTMY	C	7	UTMY coordinate of wildlife area lower boundary
18	CNTY1	C	3	1st county overlapping wildlife area
19	CNTY2	C	3	2nd county overlapping wildlife area
20	CNTY3	C	3	3rd county overlapping wildlife area
21	PW	N	1	Proposed wilderness in area? (1 = Y, 0 = N)
22	WS	N	1	Wild and scenic river in area? (1 = Y, 0 = N)
23	NWR	N	1	National Wildlife Refuge in area? (1 = Y, 0 = N)
24	NFH	N	1	National Fish Hatchery in area? (1 = Y, 0 = N)
25	WMA	N	1	Wildlife Management Area in area? (1 = Y, 0 = N)
26	WPA	N	1	Waterfowl Protection Area in area? (1 = Y, 0 = N)
27	NCA	N	1	Nature Conservancy Preserve in area? (1 = Y, 0 = N)
28	CE	N	1	Conservation Easement in area? (1 = Y, 0 = N)
29	RNA	N	1	USFS or BLM Research or Natural Area in area? (1 = Y, 0 = N)
30	OTHER	N	1	Any other Formal Land Designation Within area? (1 = Y, 0 = N)
31	OTRATE	N	1	Rating for other Land Designation, if any (1 = Y, 0 = N)
32	HABCOND	N	1	Habitat Condition of Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
33	HABFOR	N	1	Amount of Forested Land in Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
34	HABWET	N	1	Amount of Wetland Habitat in Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
35	HABISL	N	1	Amount of Islands in Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
36	HABDIV	N	1	Habitat Structure and Diversity in Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
37	HABOG	N	1	Amount of Old Growth Habitat in Wildlife Area (1 = Low, 2 = Moderate, 3 = High)
38	GRIZ	N	1	Grizzly Bear Habitat (0 = Absent, 1 = Fringe areas, 2 = Critical Habitat)

WILDLIFE.dbf Alias: WILDLIFE (continued)

39	WOLF	N	1	Gray Wolf Habitat (0 = Absent, 1 = Present)
40	EAGLE	N	1	Bald Eagle Habitat (0 = Absent, 1 = Low Density Use, 2 = Nesting or Critical
41	WHCR	N	1	Whooping Crane Habitat (0 = Absent, 1 = Present)
42	PEREG	N	1	Peregrine Falcon Habitat (0 = Absent, 1 = Present)
43	CARIB	N	1	Caribou Habitat (0 = Absent, 1 = Present)
44	WT_RNG	N	1	Seasonal Use by Whitetail Deer (see Appendix B.5)
45	WT_IV	N	1	Importance Value of Area to Whitetail Deer (1 = Low Populations; 2 = Moderate Populations; 3 = High Populations)
46	MD_RNG	N	1	Seasonal Use by Mule Deer (see Appendix B.5)
47	MD_IV	N	1	Importance Value of Area to Mule Deer (1 = Low Populations; 2 = Moderate Populations; 3 = High Populations)
48	EK_RNG	N	1	Seasonal Use in Area by Elk (see Appendix B.5)
49	EK_IV	N	1	Importance Value of Area to Elk (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
50	AN_RNG	N	1	Seasonal Use in Area by Antelope (see Appendix B.5)
51	AN_IV	N	1	Importance Value of Area to Antelope (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
52	BH_RNG	N	1	Seasonal Use in Area by Bighorn Sheep (see Appendix B.5)
53	BH_IV	N	1	Importance Value of Area to Bighorn Sheep (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
54	MO_RNG	N	1	Seasonal Use in Area by Moose (see Appendix B.5)
55	MO_IV	N	1	Importance Value of Unit to Moose (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
56	BB_RNG	N	1	Seasonal Use in Area by Black Bear (see Appendix B.5)

WILDLIFE.dbf Alias: WILDLIFE (continued)

57	BB_IV	N	1	Importance Value of Area to Black Bear (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
58	ML_RNG	N	1	Seasonal Use in Area by Mountain Lion (see Appendix B.5)
59	ML_IV	N	1	Importance Value of Area to Mountain Lion (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
60	ST_RNG	N	1	Seasonal Use in Area by Sharp-Tail Grouse (see Appendix B.5.)
61	ST_IV	N	1	Importance Value of Area to Sharp-Tail Grouse (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
62	SG_RNG	N	1	Seasonal Use in Area by Sage Grouse (see Appendix B.5)
63	SG_IV	N	1	Importance Value of Area to Sage Grouse (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
64	MG_RNG	N	1	Seasonal Use in Area by Mountain Goat (see Appendix B.5)
65	MG_IV	N	1	Importance Value of Area to Mountain Goat (1 = Low Populations, 2 = Moderate Populations, 3 = High Populations)
66	RO_HS	N	1	Habitat Suitability for River Otter (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Densi-ty/Suitability
67	BV_HS	N	1	Habitat Suitability for Beaver (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suitability)
68	BC_HS	N	1	Habitat Suitability for Bobcat (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suitability)
69	LX_HS	N	1	Habitat Suitability for Lynx (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suitability)
70	MT_HS	N	1	Habitat Suitability for Marten (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suitability)

WILDLIFE.dbf Alias: WILDLIFE (continued)

71	TU_HS	N	1	Habitat Suitability for Turkey (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suita-bility)
72	RG_HS	N	1	Habitat Suitability for Ruffed Grouse (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/-Suitability)
73	PH_HS	N	1	Habitat Suitability for Pheasant (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/-Suitability)
74	CG_HS	N	1	Habitat Suitability for Canada Geese (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/-Suitability)
75	WO_HS	N	4	(Not used)
76	WV_HS	N	1	Habitat Suitability for Wolverine (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/-Suitability)
77	OTH_HS	N	1	Habitat Suitability for Any Other Species (1 = Low Density/Suitability, 2 = Moderate Density/Suitability, 3 = High Density/Suitability)
78	WTFWLSTG	N	1	Waterfowl Staging Areas or "Prime Wetlands" in area? (1 = Y, 0 = N)
79	SPGS	N	1	Warm/Hot Springs Open in Winter and Used by Waterfowl? (1 = Y, 0 = N)
80	HIGHGRAD	N	1	Harlequin Duck or Amphibian of Special Concern in Stream? (1 = Y, 0 = N)
81	REPTSCON	N	1	Reptiles of Special Concern in Sloughs, Backwaters? (1 = Y, 0 = N)
82	COLNEST	N	1	Areas with Cormorant, Heron, Pelican Colonies? (1 = Y, 0 = N)
83	OSPREY	N	1	Large Nesting Osprey Population? (1 = Y, 0 = N)
84	GDEAGLE	N	1	Nesting Golden Eagle Cliffs? (1 = Y, 0 = N)
85	RAPTNEST	N	1	High Density Raptor Populations? (1 = Y, 0 = N)
86	SSCOTH	C	20	Other Specialized Wildlife Use Areas (verbal description)
87	SSCRATE	N	4	Rating for Other Specialized Wildlife Use Area (1 = Y, 0 = N)

WILDLIFE.dbf Alias: WILDLIFE (continued)

88	COUNTY	C	25	First Four Letters of Each County in area ("." between each 4 letter county abbreviation)
89	TOTHABPTS	N	3	Total Points from Habitat Quality Criteria
90	TOTSPPTS	N	3	Total Points from Species Quality Criteria
91	TOTHUNPTS	N	3	Total Points from Hunting Recreation Criteria
92	TOTNONPTS	N	3	Total Points from Nonconsumptive Recreation Criteria
93	TOTRECPTS	N	3	Total Recreation Points
94	HABRATE	N	1	Habitat Value Class (1 = Outstanding, 2 = Substantial, 3 = Moderate, 4 = Low, 5 = Unknown)
95	SPECRATE	N	1	Species Value Class (1 = Outstanding, 2 = Substantial, 3 = Moderate, 4 = Low, 5 = Unknown)
96	RECRATE	N	1	1 = Outstanding, 2 = Substantial, 3 = Moderate, 4 = Low, 5 = Unknown)
97	FINAL_VAL	C	1	Final Wildlife Resource Value Class (1 = Outstanding, 2 = Substantial, 3 = Moderate, 4 = Low, 5 = Unknown)
** Total **			328	

A.1.8. AREACODE.dbf

AREACODE.DBF
Master index file: AREACODE.ndx Key: CODE + AREA

Structure for database: AREACODE.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	AREA	C	3	DFWP wildlife area code
** Total **			9	

A.1.9. COUNTY.dbf

COUNTY.dbf Alias: COUNTY
Master index file: COUNTY.ndx Key: CNTY

Structure for database: COUNTY.dbf

Field	Field Name	Type	Width	Description
1	CNTY	C	3	DFWP 3-digit county code (See Appendix B.4)
2	COUNTY	C	15	Name of county
** Total **			18	

A.1.10. EPA.dbf

EPA.DBF Alias: EPA
Master index file: EPA.ndx Key: CODE

Structure for database: EPA.dbf

Field	Field Name	Type	Width	Description
1	CODE	C	6	DFWP water code
2	RRN	C	16	EPA code
** Total **			22	

A.2. INDEX FILES

As noted in the preceeding file structures, each of the data base files has a maintained index file. The following table lists the names of those files.

Table A-2: INDEX FILES

AREACODE.NDX	CNTY.NDX	COUNTY.NDX	DESCRIP.NDX
FISH.NDX	FOOR.NDX	GEO.NDX	NAT.NDX
REC.NDX	AREA.NDX	EPA.NDX	

A.3. QUERY FILES

The routines that allow the construction of query files and index files utilize special database files to allow these queries or indexes on selected variables. The data base files are denoted with the file extention name ".STR". The following table lists these files.

Table A-3: QUERY FILES

DESCRIP.STR	FISH.STR	FOOR.STR	GEO.STR
NAT.STR	REC.STR	WLRANK.STR	

A.4. FORM FILES

Many of the file dump routines use the dBASE III report format generated by dBASE III. The following table lists the report files utilized in this system.

Table A-4: REPORT FILES

AREACODE.FRM	DESCRIP.FRM	FISH.FRM	FOOR.FRM
HARVEST.FRM	REC.FRM	WLRANK.FRM	

A.5. PROGRAM FILES

The following table lists the programs comprising the Montana Rivers Study data management system.

Table A-5: PROGRAM FILES

VCAR.PRG	V_STOP.PRG	FILDUMP.PRG	RESOURCE.PRG
MASTER1.PRG	RPTFMT.PRG	COUNTY.PRG	EDITOR.PRG
EPA.PRG	FISHAPND.PRG	FISHEDIT.PRG	FLTROUPT.PRG
FOORAPND.PRG	FOOREDIT.PRG	GENPROCS.PRG	GEOAPND.PRG
GEOEDIT.PRG	GEOGRAPH.PRG	GEONAT.PRG	GEOSAVE.PRG
NAT1.PRG	NATAPND.PRG	NATEDIT.PRG	NATSAVE.PRG
NRIMS.PRG	RECAPND.PRG	RECEDIT.PRG	RECFRM.PRG
RECSAVE.PRG	TOWNSHIP.PRG	WILDMENU.PRG	USGSCODE.PRG
VALUCLAS.PRG	VCAS.PRG	WTRCODE.PRG	

APPENDIX B

TABLES USED IN CODING DATA

APPENDIX B.1

CODES USED FOR NATIONAL FORESTS AND FOREST DISTRICTS (FISH.DBF)

FOREST AND DISTRICT CODES, FOREST SERVICE REGION 1

Forest	Code	District	Code
BEAVERHEAD	02	Dillon	01
		Wise River	02
		Wisdom	03
		Sheridan	06
		Madison	07
BITTERROOT	03	Stevensville	01
		Darby	02
		Sula	03
		West Fork	04
CUSTER	08	Sheyenne	01
		Beartooth	02
		Sioux	03
		Ashland	04
		Ft. Howes	05
		Grand River	06
		Medora	07
		McKenzie	08
DEERLODGE	09	Deerlodge	01
		Jefferson	02
		Philipsburg	03
		Butte	04
FLATHEAD	10	Swan Lake	01
		Spotted Bear	04
		Hungry Horse	06
		Glacier View	07
		Tally Lake	08
GALLATIN	11	Big Timber	01
		Livingston	02
		Gardiner	03
		Bozeman	05
		Gallatin	06
		Hebgen Lake	07

FOREST AND DISTRICT CODES, FOREST SERVICE REGION 1 (continued)

Forest	Code	District	Code
HELENA	12	Townsend	01
		Helena	02
		Lincoln	04
KOOTENAI	14	Rexford	01
		Yaak	02
		Fortine	03
		Troy	04
		Libby	05
		Fisher River	06
		Cabinet	07
LEWIS & CLARK	15	Teton	01
		Sun River	02
		Belt Creek	03
		Judith	04
		Musselshell	06
		White Sulphur	07
LOLO	16	Missoula	03
		Ninemile	04
		Plains	05
		Seeley Lake	06
		Superior	07
		Thompson Falls	08

APPENDIX B.2

CODES FOR OTHER LAND AND WATER BASED ACTIVITIES (REC.DBF)

(1 = Primary Use, 2 = Secondary Use)

01	Waterfowl hunting	1
02	Big game hunting	1
03	Upland bird hunting	1
04	Upland bird hunting	2
05	Big game hunting	2
06	Waterfowl hunting	2
07	Hunting	1
08	Hunting	2
09	Summer homes	1
10	Woodcutting	1
11	Rock collecting	1
12	Rock collecting	2
13	Trapping	1
14	Woodcutting	2
15	Bird hunting	1
16	Bird hunting	2
17	Pleasure driving (gravel roads)	1
18	Trapping	2
19	Pleasure driving (gravel roads)	2
24	Cross-country skiing	1
25	Cross-country skiing	2
26	Horseback riding	2
27	Wildlife viewing	2
28	Birdwatching	2
29	Mountain climbing	1
30	Snowmobiling	1
31	Backpacking	1
32	Crayfishing	1
33	Outfitting	1
34	Bow hunting	1
35	Horseback riding	1
36	Ice fall climbing	2
37	Ghost town visiting	2
38	Gold panning	1
39	Ghost town	1
40	Float boating	1
41	Mountain biking	2
42	Four-wheel driving	2
43	Water play	2
44	Scenic viewing	1
45	Waterskiing	1
47	Waterskiing	2
48	Scenic viewing	2
49	Photography	2
50	Taking minnows	1

APPENDIX B.3

EXPLANATIONS FOR VALUE CLASS ASSIGNMENTS
RECREATION (REC.DBF)

Stream Characteristics

05 Short segment
16 Bank erosion/disturbed shoreline
33 Meandering/braided
34 Major waterfall
37 No whitewater or falls
47 Small creek/low flows/intermittent
50 Long free-flowing segment
84 Mountain stream/falls

Recreational Opportunities

07 Limited recreational values/opportunities/potential
25 No camping areas
32 Recreation opportunities/potential good/high/excellent
48 Camping opportunities good/abundant
59 Diverse recreational opportunities
66 Woodcutting
67 Developed recreation sites
70 Agates
74 Picnicking
92 Horseback riding
97 Hiking
98 Cross-country skiing
99 Snowmobiling

Recreational Use

06 Low recreational use
20 Moderate recreational use
39 Low/secondary water-based use
43 Low population base nearby/mainly local use
49 High recreational use
76 Close to large urban area

Boating

10 Useable by jetboats
19 Floating difficult
30 Good boating
36 Boating opportunities limited
58 Few people float/minor use
60 Commercial floating
71 Challenging rapids
88 Heavy floating use

EXPLANATIONS FOR VALUE CLASS ASSIGNMENTS (REC.DBF) (continued)

Fishing

08	Fishery good/excellent/popular
24	Fishing is poor/limited
72	Paddlefish
78	Fishing use light
83	Fishing fair/moderate

Hunting

09	Waterfowl hunting
21	Hunting popular/good potential
26	Hunting limited
35	Big game hunting good/excellent
51	Upland bird hunting
89	Wildlife abundant (hunting & non-consumptive use)

Wildlife Habitat

09	Wildlife/birds abundant
15	Poor riparian habitat
42	Grizzly habitat
45	Excellent riparian habitat
79	Wildlife habitat/range/habitat
87	Spawning ground
90	Special wildlife species (grayling/mtn goat/cutthroat, etc)

Scenic Attributes

01	Scenic quality good/substantial/outstanding
18	Unusual topography/environment (rugged/canyons/badlands/gorges)
27	Scenic quality low/limited/typical/uniform
52	Scenic quality moderate/nice

Access

13	Access restricted/limited/poor
17	Access good/abundant
22	Private property/mostly private lands
23	Good trail system/access
31	Access moderate
41	Mostly public land
82	Fences across stream/beaver dams
85	Mixed public and private

EXPLANATIONS FOR VALUE CLASS ASSIGNMENTS (REC.DBF) (continued)

Level of Development

02	Primitive country/natural/pristine
11	Diversion dams/irrigation structures
14	Logging/clear cuts
40	Major fire impact
53	Much traffic/congested
55	Highway/road parallels stream
57	Flows through town/city
62	Solitude
63	Riprap
64	Agricultural lands
68	Homesite development
69	Development present (golf course/ski area)
73	Remote
77	Considerable evidence of man
81	Railroad parallels stream

Water Quality

03	Clean water/good quality
28	Muddy water
65	Municipal water supply
80	Poor water quality

Other Attributes

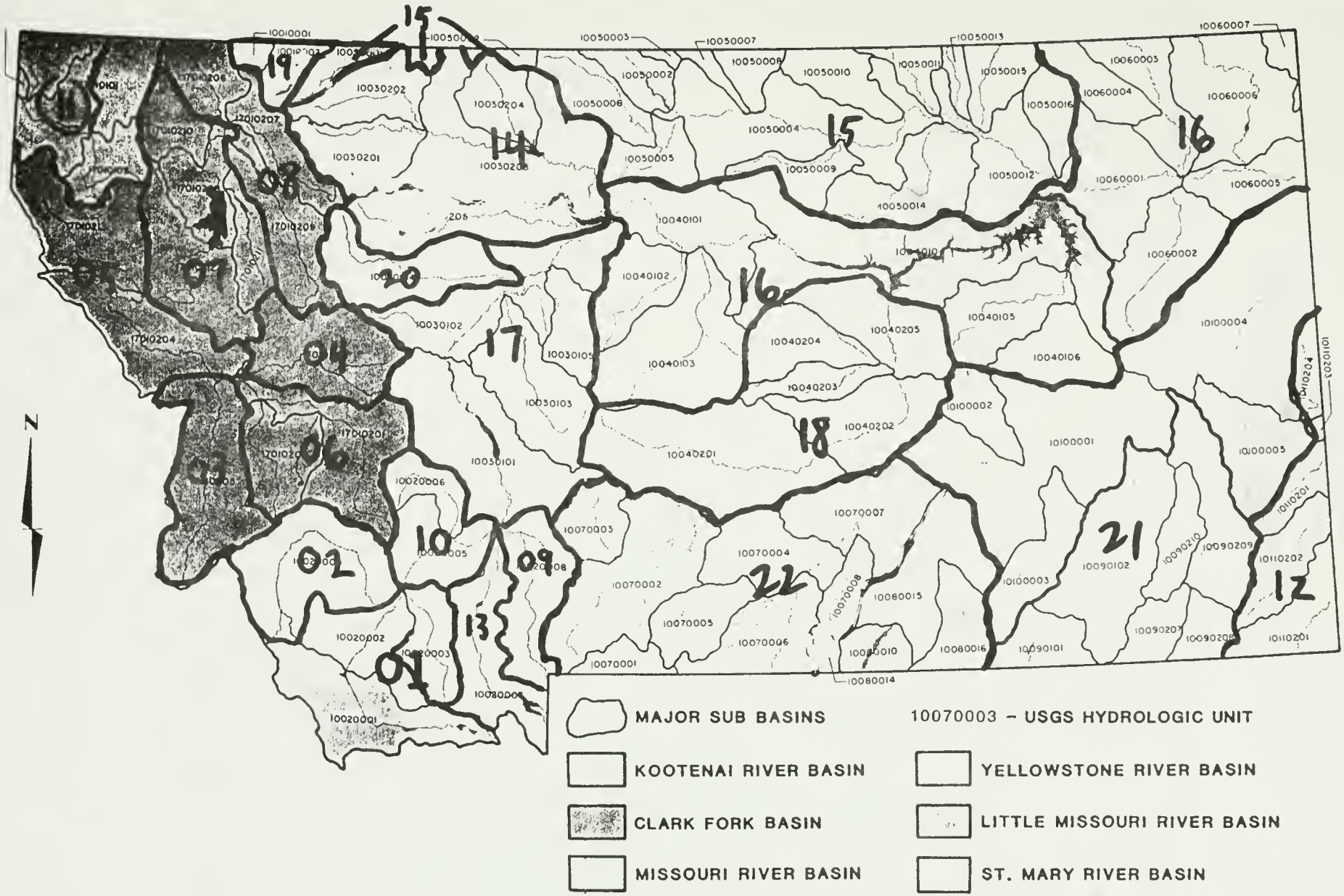
04	Historical significance
38	Special management area
44	Potential unknown
46	Indian religious area/prehistoric sites/pictographs
56	Unique resource
75	Possible recreational river candidate
86	Flows into/provides access to wilderness area
91	Historical site/mining activity

APPENDIX B.4

CODES FOR FISH, WILDLIFE & PARKS RIVER DRAINAGES
(NOTE: THESE ARE THE FIRST TWO DIGITS OF THE DFWP WATER CODE)

01	Beaverhead
02	Big Hole
03	Bitterroot
04	Blackfoot
05	Clark Fork (below Bitterroot River)
06	Clark Fork (above Bitterroot River)
07	Flathead (below South Fork)
08	Flathead (above & including South Fork)
09	Gallatin
10	Jefferson
11	Kootenai
12	Little Missouri
13	Madison
14	Marias
15	Milk
16	Missouri (below Marias River)
17	Missouri (above Marias River)
18	Musselshell
19	St. Mary
20	Sun
21	Yellowstone (below Bighorn River)
22	Yellowstone (above & including Bighorn River)

APPENDIX B.4 (continued)
DFWP DRAINAGE CODES



APPENDIX B.5

CODES FOR WILDLIFE SEASONAL USE (WILDLIFE.DBF)

Wildlife Seasonal Use Codes

1	Year-round
2	Spring
3	Summer
4	Fall
5	Winter
6	Spring and Summer
7	Spring and Fall
8	Spring and Winter
9	Summer and Fall
10	Summer and Winter

APPENDIX C

SAMPLES OF REPORT PRINTOUTS

APPENDIX C.2

EXAMPLE OF VALUE CLASS SUMMARY BY REACH

MONTANA RIVERS STUDY — Page 1
SUMMARY OF VALUE CLASS ASSIGNMENTS BY REACH
01/05/87 - 19:21

```
SET FILTER TO CODE()"109999" .AND. CODE()"174844"
INDEX ON RIV_NAME TO DESCRIP1
```

RIVER NAME	WATER CODE	RESOURCE	REACH	UPPER BOUNDARY	LOWER BOUNDARY	VALUE
ABBOT CREEK	080020	Fisheries	A67	SOURCE	MOUTH	4
		Wildlife	JDU	-	-	5
ADA CREEK	080040	Wildlife	JL6	-	-	2
ADAIR CREEK	220014	Fisheries	442	BONHOMN RANCH XING	MOUTH	3
		Wildlife	JH3	-	-	2
ADAMS CREEK	170016	Fisheries	BBR	2.1 KM ABOVE MOUTH	MOUTH	4
			BBS	3.3 KM ABOVE MOUTH	2.1 KM ABOVE MOUTH	6
			BBT	7.4 KM ABOVE MOUTH	5.3 KM ABOVE MOUTH AT RD	6
			BBU	HEADWATERS	7.4 KM ABOVE MOUTH	6
			BBV	HEADWATERS	MOUTH	6
ADAMS CREEK	050016	Cultural	1125	T15N- R23W - SEC 22	T15N- R23W - SEC 27	1
		Wildlife	JLY	-	-	2
ADDITION CREEK	080060	Fisheries	A59	SOURCE	MOUTH	2
		Wildlife	JL5	-	-	1
ADOLPH CREEK	170032	Cultural	426	T04N- R05E - SEC 27	T04N- R05E - SEC 08	1
ADVENT CREEK	070020	Fisheries	A0Z	SOURCE	MOUTH	4
		Wildlife	JKD	-	-	2
AENEAS CREEK	080080	Fisheries	A6V	SOURCE	MOUTH	3
		Wildlife	JL4	-	-	2
AFTERBAY CREEK	220017	Fisheries	065	HEADWATERS	MOUTH	6
AHORN CREEK	200050	Fisheries	AE8	FORKS	MOUTH	4
AKINKOKA CREEK	080100	Cultural	169	T36N- R23W - SEC 34	T36N- R23W - SEC 26	1
AKOKALA CREEK	080110	Fisheries	DB6	2.6 KM BELOW PARKE CREEK	MOUTH	2
			DBH	AKOKALA LAKE	2.6 KM BELOW PARKE CREEK	2
ALABAUGH CREEK	180060	Fisheries	335	GRANDE RANCH	MOUTH	4
		Recreation	1	HEADWATERS	ROBINSON CR	4
		Wildlife	JCU	-	-	3
ALBERS SLOUGH	019110	Cultural	710	T05S- R07W - SEC 30	T05S- R07W - SEC 20	1
		Fisheries	AKE	DRUMMY DITCH #2	MOUTH	4
		Geological	461	-	-	1
		Recreation	1	WILLARD SLOUGH	BEAVERHEAD R	5
		Wildlife	JLC	-	-	2
ALBERT CREEK	050032	Fisheries	DVJ	TWO TRIBUTARIES	RD XING	4

APPENDIX C.3.1.

EXAMPLE OF RESOURCE AREA DETAILED REPORT - FISHERIES

MONTANA RIVERS STUDY
FISHERIES ASSESSMENT DETAILS
01/05/87 - 19:27

INDEX ON RIV_NAME TO FISH1

CODE: 080020 RIVER NAME: ABBOT CREEK
SECTION: 000 SERIAL (REACH): A67 LENGTH: 9.7 km
LOWER BOUNDARY: MOUTH T30NR19W05ADC
UPPER BOUNDARY: SOURCE T31NR19W34BDA
TRIBUTARY TO: FLATHEAD RIVER
DFWP REGION: 1 USGS HYDROLOGIC UNIT CODE: 17010208
NATIONAL FOREST: 10 DISTRICT: 06 COUNTIES: FLAT.
VALUE CLASS ASSIGMNENTS: (1 = outstanding, 2 = high-value, 3 = substantial, 4 = moderate, 5 = limited, 6 = insufficient data)
RESOURCE VALUE: 4 SPORT FISHERIES VALUE: 4
HABITAT & SPECIES VALUE: 4 FINAL VALUE: 4

CODE: 220014 RIVER NAME: ADAIR CREEK
SECTION: 001 SERIAL (REACH): 442 LENGTH: 6.0 km
LOWER BOUNDARY: MOUTH T01SR10E09
UPPER BOUNDARY: BONHOMN RANCH XING T01NR10E35AACA
TRIBUTARY TO: SHIELDS RIVER
DFWP REGION: 3 USGS HYDROLOGIC UNIT CODE: 10070003
NATIONAL FOREST: 11 DISTRICT: 05 COUNTIES: PARK.
VALUE CLASS ASSIGMNENTS: (1 = outstanding, 2 = high-value, 3 = substantial, 4 = moderate, 5 = limited, 6 = insufficient data)
RESOURCE VALUE: 3 SPORT FISHERIES VALUE: 4
HABITAT & SPECIES VALUE: 3 FINAL VALUE: 3

CODE: 170016 RIVER NAME: ADAMS CREEK
SECTION: 221 SERIAL (REACH): BBR LENGTH: 2.1 km
LOWER BOUNDARY: MOUTH T12NR07E26CDBC
UPPER BOUNDARY: 2.1 KM ABOVE MOUTH T12NR07E24CCCC
TRIBUTARY TO: SHEEP CREEK
DFWP REGION: 4 USGS HYDROLOGIC UNIT CODE: 10030103
NATIONAL FOREST: 15 DISTRICT: 07 COUNTIES: MEAG.
VALUE CLASS ASSIGMNENTS: (1 = outstanding, 2 = high-value, 3 = substantial, 4 = moderate, 5 = limited, 6 = insufficient data)
RESOURCE VALUE: 4 SPORT FISHERIES VALUE: 5
HABITAT & SPECIES VALUE: 4 FINAL VALUE: 4

CODE: 170016 RIVER NAME: ADAMS CREEK
SECTION: 222 SERIAL (REACH): BBS LENGTH: 3.2 km
LOWER BOUNDARY: 2.1 KM ABOVE MOUTH T12NR07E24CCCC
UPPER BOUNDARY: 5.3 KM ABOVE MOUTH T12NR07E18BBCC
TRIBUTARY TO: SHEEP CREEK
DFWP REGION: 4 USGS HYDROLOGIC UNIT CODE: 10030103
NATIONAL FOREST: 15 DISTRICT: 07 COUNTIES: MEAG.
VALUE CLASS ASSIGMNENTS: (1 = outstanding, 2 = high-value, 3 = substantial, 4 = moderate, 5 = limited, 6 = insufficient data)
RESOURCE VALUE: 6 SPORT FISHERIES VALUE: 6
HABITAT & SPECIES VALUE: 6 FINAL VALUE: 6

APPENDIX C.3.2

EXAMPLE OF RESOURCE AREA DETAILED REPORT - WILDLIFE

MONTANA RIVERS STUDY
WILDLIFE ASSESSMENT DETAILS
01/05/87 - 20:20

Page

Water Code: 010130 Stream name: ANTELOPE CREEK

*** WILDLIFE AREA DESCRIPTION ***

Area JGE: RED ROCK RIVER DFWP Region: 3
Lower Bdy: LIMA DAM (Riv. Mi. 2542.2, Legal: T14SR05W01)
Upper Bdy: HEADWATERS (Riv. Mi. 2615.4)
Trib to: BEAVERHEAD RIVER Hydro Unit: 10020001 Drainage: 01.0
Unit Type: BASIN Counties: SILV.

*** HABITAT CRITERIA ***

DESIGNATED HABITAT PROTECTION:

HABITAT QUALITY:
Condition: HIGH
Forested: HIGH
Wetlands: HIGH
Islands: HIGH
Old Growth: HIGH

TOTAL HABITAT CRITERIA POINTS: 164

*** SPECIES CRITERIA ***

T & E SPECIES (0 = absent, 1 = present, 2 = critical habitat)

Grizzly Bear: 2	Bald Eagle: 1	Wolf: 0
Whooping Crane: 1	Peregrine Falcon: 1	Caribou: 0

GAME & FURBEARER SPECIES VALUE (* 0 = None, 1 = Low, 2 = Moderate, 3 = High)

	Value*	Seasonal use		Hab Suit/Dens*
Whitetail Deer:	0	NONE	River Otter:	1
Mule Deer:	3	SPRING & FALL	Beaver:	3
Elk:	3	YEARROUND	Bobcat:	2
Antelope:	3	SPRING & FALL	Lynx:	3
Bighorn Sheep:	0	NONE	Marten:	3
Moose:	3	YEARROUND	Wild Turkey:	0
Black Bear:	3	YEARROUND	Ruffed Grouse:	3
Mountain Lion:	3	YEARROUND	Pheasant:	0
Sharptail Grouse:	0	NONE	Canada Goose:	3
Sage Grouse:	3	YEARROUND	Wolverine:	0
Mountain Goat:	0	NONE	Other:	0

SPECIALIZED WILDLIFE USE AREAS:
Waterfowl staging areas, 'prime wetlands,' Warm/hot springs open i n winter and used by waterfowl. Areas with cormorant, heron, pelic an colonies, Golden eagle nesting cliffs present, High-density ra ptor populations.

TOTAL SPECIES QUALITY POINTS: 227

RECREATION CRITERIA

Total points for: hunting recreation = 51 Nonconsumptive recreation = 125

TOTAL RECREATION POINTS: 176

TOTAL POINTS

Habitat: 164 Species: 227 Recreation: 176

FINAL RATINGS

(1 = Outstanding, 2 = Substantial, 3 = Moderate, 4 = Limited, 5 = Unknown)

Habitat: 1 Species: 1 Recreation: 1

FINAL VALUE CLASS: 1

APPENDIX C.3.3.

EXAMPLE OF RESOURCE AREA DETAILED REPORT -
GEOLOGICAL AND OTHER NATURAL FEATURES

FILE: GEO.dbf RECORD NO: 6 01/05/87 19:30:14

INDEX ON WATER CODE (or Normal Index) TO GEO1

SITE NUMBER: G-6 DFWP RIVER CODE:
SITE NAME: Gardiner Landslides
TYPE: landslide. .
STATUS: Proposed NNL.priority 1-D,Yellowstone NP
COUNTIES: PARK; ;
RIVER NAME: Gardiner River RIVER MILES 0 - 2.0
QUADS: Gardiner (1955 . 15) (19 ,)
BLM 1:100000 MAP NUMBER: 32
LEGAL: T- 95 -T R- 8 E - R
SECTIONS: SW1/4,S25,S26,S27,N3/4,S34,N3/4,S35,W1/2,NW1/4,S36
LATITUDE: - LONGITUDE: -
DESCRIPTION:
See Hyndman and Alt (1982), pp. 109-110 (#10). Fields and Melton (1985) suggest that landslide extends to NW as far as Yankee Jim Canyon.

SOURCES: :
See description
ACCURACY: 1
UNIQUENESS: 3 DESIGNATION: 1 USE: SCIENTIFIC VALUE: 3
FINAL VALUE CLASS: 1

FILE: GEO.dbf RECORD NO: 17 01/05/87 19:30:20

INDEX ON WATER CODE (or Normal Index) TO GEO1

SITE NUMBER: G-17 DFWP RIVER CODE:
SITE NAME: Lower Shonkin Sag
TYPE: underfit stream, .
STATUS: Proposed NNL, priority 1-D
COUNTIES: CHOU; ;
RIVER NAME: Closed basin RIVER MILES -
QUADS: Shonkin (1972 , 7.5) Montague (1972 , 7.5)
BLM 1:100000 MAP NUMBER: 29
LEGAL: T- 22 N -T R- 9 E - R 10 E
SECTIONS: S12,S1/4,S1,S7,8,9-11,S1/4,5,6,W1/2,S12,W3/4,S13,E3/4
LATITUDE: - LONGITUDE: -
DESCRIPTION:
See Hyndman and Alt (1982), pp. 164-169 (#24)

SOURCES: :
See description
ACCURACY: 1
UNIQUENESS: 2 DESIGNATION: 1 USE: SCIENTIFIC VALUE: 1
FINAL VALUE CLASS: 1

EXAMPLE OF RESOURCE AREA DETAILED REPORT _ RECREATION

MONTANA RIVERS STUDY Page 1
RECREATION ASSESSMENT DETAILS
01/05/87 - 19:33

INDEX ON WATER CODE (or Normal Index) TO REC1

CODE: 010040 RIVER NAME: ALDER GULCH CR
SEGMENT NO.: 1 LENGTH: 14 km
LOWER BOUNDARY: RUBY R UPPER BOUNDARY: HUNGRY HOLLOW
DFWP REGION: 3 RATING AGENCIES: USFS ONLY
WATER CHARACTER: Not boated MONTHS/YR BOATABLE: 0
ACTIVITY RATINGS: (1 = Primary activity, 2 = Secondary activity)

MOTOR BOATING:	0	CANOEING:	0	KAYAKING:	0	RAFTING:	0
TUBING:	0	SWIMMING:	0	BOAT FISHING:	0	SHORE FISH:	1
TENT CAMPING:	2	CAR CAMPING:	2	TRAIL USE:	0	MTR TRAILER:	0
DRIVING:	1	VIEWING:	1	PICNICING:	2		

USE LEVEL: Unknown USE ESTIMATE: Heavy ACCESS: Moderate
SCENIC QUALITY: Outstanding ROS CLASS: Rural
NO. DEVELOPED RECREATION SITES: 2
VALUE CLASS ASSIGNMENTS (1 = outstanding, 2 = substantial,
3 = moderate, 4 = limited, 5 = unclassified, 0 = not rated)
DFWP: 0 BLM: 0 USFS: 2 FINAL VALUE: 2

CODE: 010480 RIVER NAME: BEAVER CREEK
SEGMENT NO.: 1 LENGTH: 6 km
LOWER BOUNDARY: W FK RUBY R UPPER BOUNDARY: HEADWATERS
DFWP REGION: 3 RATING AGENCIES: DFWP only
WATER CHARACTER: Not boated MONTHS/YR BOATABLE: 0
ACTIVITY RATINGS: (1 = Primary activity, 2 = Secondary activity)

MOTOR BOATING:	0	CANOEING:	0	KAYAKING:	0	RAFTING:	0
TUBING:	0	SWIMMING:	0	BOAT FISHING:	0	SHORE FISH:	0
TENT CAMPING:	0	CAR CAMPING:	0	TRAIL USE:	0	MTR TRAILER:	0
DRIVING:	0	VIEWING:	0	PICNICING:	0		

USE LEVEL: Unknown USE ESTIMATE: ACCESS:
SCENIC QUALITY: ROS CLASS:
NO. DEVELOPED RECREATION SITES: 0
VALUE CLASS ASSIGNMENTS (1 = outstanding, 2 = substantial,
3 = moderate, 4 = limited, 5 = unclassified, 0 = not rated)
DFWP: 5 BLM: 0 USFS: 0 FINAL VALUE: 5

CODE: 010500 RIVER NAME: BEAVERHEAD R
SEGMENT NO.: 2 NAME: UPPER BEAVERHD LENGTH: 21 km
LOWER BOUNDARY: DILLON UPPER BOUNDARY: CLARK CYN DAM
DFWP REGION: 3 RATING AGENCIES: All agencies
WATER CHARACTER: Minor/Moderate rapids MONTHS/YR BOATABLE: 7
ACTIVITY RATINGS: (1 = Primary activity, 2 = Secondary activity)

MOTOR BOATING:	2	CANOEING:	1	KAYAKING:	1	RAFTING:	1
TUBING:	2	SWIMMING:	0	BOAT FISHING:	1	SHORE FISH:	1
TENT CAMPING:	2	CAR CAMPING:	2	TRAIL USE:	0	MTR TRAILER:	2
DRIVING:	1	VIEWING:	2	PICNICING:	1		

USE LEVEL: Unknown USE ESTIMATE: Heavy/Moderate ACCESS: Moderate
SCENIC QUALITY: Subst/Moderate ROS CLASS: Transition
NO. DEVELOPED RECREATION SITES: 3
VALUE CLASS ASSIGNMENTS (1 = outstanding, 2 = substantial,
3 = moderate, 4 = limited, 5 = unclassified, 0 = not rated)
DFWP: 1 BLM: 1 USFS: 1 FINAL VALUE: 1

APPENDIX C.3.5.

EXAMPLE OF RESOURCE AREA DETAILED REPORT - CULTURAL FEATURES

MONTANA RIVERS STUDY Page 1
CULTURAL FILE RESOURCE / DUMP
01/05/87 - 19:36

INDEX ON RIV_NAME TO FOOR1

CODE	050016	FINAL_VAL	1				
	REACH	1125	RESOURCE	C	MAP_NAME	PLAINS	
	RIV_NAME	ADAMS CREEK					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	15N	UP_RAN	23W	UP_SEC	22	
	LO_TWP	15N	LO_RAN	23W	LO_SEC	27	
CODE	170032	FINAL_VAL	1				
	REACH	426	RESOURCE	C	MAP_NAME	TOWNSEND	
	RIV_NAME	ADOLPH CREEK					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	04N	UP_RAN	05E	UP_SEC	27	
	LO_TWP	04N	LO_RAN	05E	LO_SEC	08	
CODE	080100	FINAL_VAL	1				
	REACH	169	RESOURCE	C	MAP_NAME	WHITEFISH	
	RIV_NAME	AKINKOKA CREEK					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	36N	UP_RAN	23W	UP_SEC	34	
	LO_TWP	36N	LO_RAN	23W	LO_SEC	26	
CODE	019110	FINAL_VAL	1				
	REACH	710	RESOURCE	C	MAP_NAME	DILLON	
	RIV_NAME	ALBERS SLOUGH					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	05S	UP_RAN	07W	UP_SEC	30	
	LO_TWP	05S	LO_RAN	07W	LO_SEC	20	
CODE	060057	FINAL_VAL	1				
	REACH	778	RESOURCE	C	MAP_NAME	ENNIS	
	RIV_NAME	ALDER GULCH					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	07S	UP_RAN	03W	UP_SEC	12	
	LO_TWP	06S	LO_RAN	03W	LO_SEC	08	
CODE	010040	FINAL_VAL	1				
	REACH	734	RESOURCE	C	MAP_NAME	DILLON	
	RIV_NAME	ALDER GULCH CREEK					
	VALUE_A	VALUE_B		VALUE_C		VALUE_D	
	UP_TWP	05S	UP_RAN	04W	UP_SEC	32	
	LO_TWP	05S	LO_RAN	04W	LO_SEC	32	

APPENDIX C.4

EXAMPLE OF STRAIGHT FILE DUMP OF DESCRIP.DBF

INDEX ON RIV_NAME TO DESCRIP1

Code 109999 River Name: Rec 3080
Region TRS County
EPA # Trib To
Hyd. Unit Length 0.0
Final Values: (wild) (fish) (cult) (nat) (geo) (rec)
Overall Final Value :

Code 174844 River Name: Rec 3814
Region TRS County
EPA # Trib To
Hyd. Unit Length 0.0
Final Values: (wild) (fish) (cult) (nat) (geo) U (rec)
Overall Final Value :

Code 080020 River Name: ABBOT CREEK Rec 1127
Region 1 TRS T30NR19W05ADC County FLAT.
EPA # Trib To FLATHEAD RIVER
Hyd. Unit 17010208 Length 9.7
Final Values: (wild) 5 (fish) 4 (cult) (nat) (geo) (rec)
Overall Final Value : 4

Code 080040 River Name: ADA CREEK Rec 3006
Region 1 TRS T29NR18W00 County
EPA # Trib To
Hyd. Unit 17010209 Length 0.0
Final Values: (wild) 2 (fish) (cult) (nat) (geo) (rec)
Overall Final Value : 2

Code 220014 River Name: ADAIR CREEK Rec 2245
Region 3 TRS T01SR10E09 County PARK.
EPA # Trib To SHIELDS RIVER
Hyd. Unit 10070003 Length 6.0
Final Values: (wild) 2 (fish) 3 (cult) (nat) (geo) (rec)
Overall Final Value : 2

Code 170016 River Name: ADAMS CREEK Rec 1855
Region 4 TRS T12NR07E26CDBC County MEAG.
EPA # Trib To SHEEP CREEK
Hyd. Unit 10030103 Length 11.6
Final Values: (wild) (fish) 4 (cult) (nat) (geo) (rec)
Overall Final Value : 4

Code 050016 River Name: ADAMS CREEK Rec 2857
Region 2 TRS T15NR23W33 County
EPA # Trib To
Hyd. Unit 17010204 Length 0.0
Final Values: (wild) 2 (fish) (cult) 1 (nat) (geo) (rec)
Overall Final Value : 1

APPENDIX D

LIST OF CONTACT PERSONNEL

Northwest River Study Contact Personnel

State Coordinators

Pat Graham
MDFWP
1420 E. Sixth Avenue
Helena, MT 59620
444-2449

Larry Peterman
MDFWP
1420 E. Sixth Avenue
Helena, MT 59620
444-3183

Data Management/Programming:

Larry Thompson
Natural Resource Information System
Montana State Library
1515 E. Sixth Avenue
Helena, MT 59620
444-3115

Sandy Fiance
MDFWP
1420 E. Sixth Avenue
Helena, MT 59620
444-3795

Project Management/Wildlife:

Janet Decker-Hess
MDFWP
P.O. Box 67
Kalispell, MT 59903
752-5501 ext. 220

Recreation:

Stewart Allen
University of Idaho
Department of Wildlands/Recreation Management
428 Veatch
Moscow, ID 83843
Home: (208) 885-7911
Office: (208) 885-7428

Fisheries:

Bob McFarland/Randy Merry
MDFWP
P.O. Box 5
Bozeman, MT 59717
994-6355

Natural Features/Geologic and Hydrologic Features:

Larry Thompson
(see address above)

DOE/BP-830
May 1987
1C